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Electricity Costing and Pricing Study

Volume II

Determining the Annual Cost of Power and Report on Allocation of Costs



October, 1976



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ELECTRICITY COSTING AND PRICING STUDY

VOLUME IIA
DETERMINING THE ANNUAL COST OF POWER

Ontario Hydro
October 1976

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Publications

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I. INTRODUCTION

The revenue requirement for power produced and supplied by Ontario Hydro is determined on an historical-cost basis. In other words, costs are ascertained when or after they have been incurred, at the dollar value prevailing at the time of the transaction. This is not as straightforward as it may appear, because there are many accepted methods for determining the cost of individual elements such as depreciation and fuel. The most appropriate method is the one that best meets the requirements of the total organization.

The purpose of cost determination is to provide information for planning and control and to meet external obligations. For Ontario Hydro, an important aspect of planning is the determination of the aggregate annual revenue requirement. This is a forecasting-function which applies established cost-determination methods to future data. The external obligations include reporting to the Government of Ontario and statutory requirements related to borrowing money.

Because annual costs are used as a basis in determining revenue requirements, it is important in choosing a cost-determination method to ensure that costs can be allocated between those that result in benefits to current customers and those that benefit future customers. It is also important to allocate costs to categories reflecting the use of facilities.

Reviews are made periodically of the policies and procedures used in determining the cost of the components that comprise the total annual cost of power. However, with inflation and changes in power-system technology, it was decided that a study of the process for determining revenue requirements with an emphasis on cost-allocation procedures was a logical starting-point to the studies being undertaken on the costing and pricing of electricity in Ontario. Changes resulting from the studies will not eliminate the need for cost allocation and the determination of annual revenue requirements.

A. SCOPE OF STUDY

Ontario Hydro's total annual expenditures are incurred for items relating to the current production and supply of power, such as fuel, and for items required for the future production and supply of power, such as the construction of a new generating-station. To determine the annual cost of power it is necessary to classify annual expenditures as those that provide current benefits and those that provide future benefits. It is also necessary to determine the portion of earlier years' expenditures which provides benefit to the current customers. The cost of power for a given year consists of the sum of those costs classified as current and the portion of the previously incurred costs deemed to benefit current customers (e.g. depreciation), plus any appropriations or withdrawals for the Reserve for the Stabilization of Rates and Contingencies and debt retirement. This is shown graphically in Figure 1.

The study examined total cost, including common, non-common, and retail-distribution functions. Common functions consist of costs related to facilities deemed necessary to form a power system to serve all wholesale customers. Non-common functions represent the cost of facilities supplied by Ontario Hydro beyond the common point, and generally provided on an 'as-required' basis. Retail-distribution costs are those pertaining to the system necessary to provide power to customers besides those who buy in bulk as large direct customers or are served by a municipal utility. The classification of costs to the non-common and retail-distribution functions is the subject of separate

reports appearing in Volume 2B. The remaining costs are classified as common, and are allocated to customers on an equal basis according to use.

The rules for classifying expenditures between future benefits (capital assets) and current benefits (cost of power) were examined as the first step in the study. The current method for each element of the cost of power was then documented, alternative methods examined, and the most appropriate method ascertained.

Some elements of cost that were examined had recently been the subject of in-depth studies (depreciation), while plans had been made to study others fully in the near future (overheads). It was not reasonable to devote great effort to these areas, but they were examined principally to ensure that cost-allocation requirements would be met. However, this report does contain some recommendations about the areas due to be studied.

B. STUDY OBJECTIVES

This study was primarily concerned with determining the annual revenue requirement as illustrated by the study objectives:

1. To define costs or charges which should be reflected in the annual cost of power;
2. To assess the adequacy of present mechanisms in the context of determining annual revenue requirements; and
3. To review the appropriateness of the cost categories used for allocation purposes.

C. EVALUATION CRITERIA

To meet these objectives while recognizing external requirements, the following criteria were developed to evaluate cost-determination methods:

1. *Equitable division of costs between current and future years.*

Operating-costs and fixed charges should be allocated as closely as is reasonably possible to the periods in which the benefits related to those costs are received.

2. *Generally accepted accounting-principles should be applied.*

Statements should be prepared in accordance with generally accepted accounting-principles to meet Ontario Hydro's financial-reporting requirements and permit receipt of an unqualified report from the external auditors.

3. *There should be a consistent treatment of costs.*

A method should not cause a large fluctuation of costs from year to year owing to varying treatment, or require making judgemental decisions on an ongoing basis.

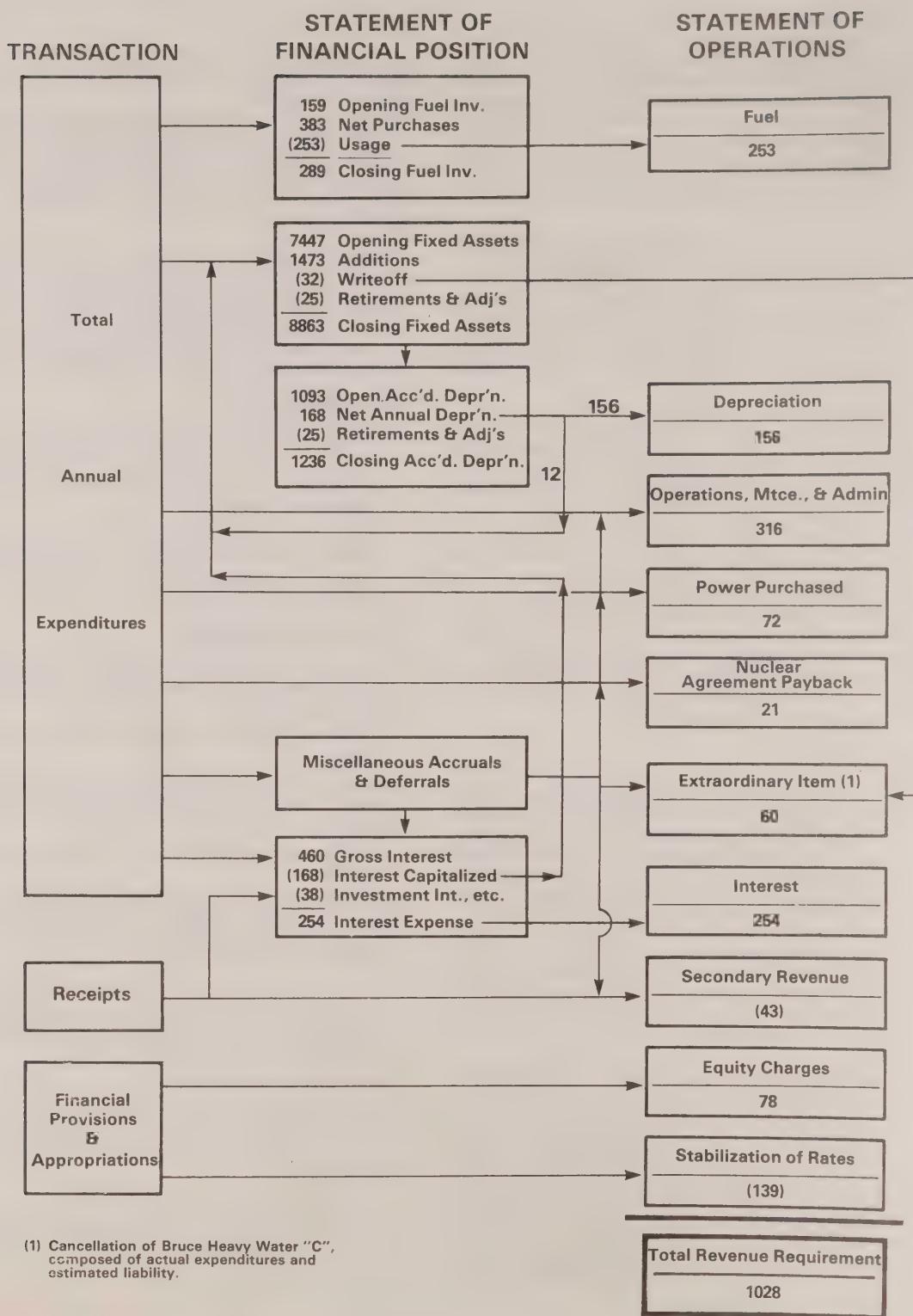
4. *Benefits of the method should outweigh its costs.*

Methods of determining costs should be as simple and readily understandable as possible, so that the degree of refinement does not exceed the benefits. Judgement will be used in applying this criterion.

5. *The method should be versatile.*

If a new process is introduced, it is desirable to maintain it for many years. It should therefore be adaptable to changing conditions.

ONTARIO HYDRO
1975 ANNUAL COST OF POWER
 MILLIONS OF DOLLARS



The recommended methods for determining costs are, in the opinion of the study team, the best possible fit within the criteria. While the report does not attempt to list how the criteria are met, their consideration was important in the choice of methods. In some cases, more than one alternative met the criteria. The method chosen in these instances was the one judged to fit the criteria most appropriately.

Some consideration was also given to the methods other energy suppliers use to determine costs. A cursory examination revealed that methods are reasonably consistent, and this factor did not affect the recommendations or choice of methods.

D. SUMMARY OF RECOMMENDATIONS

Overall, the study found that the present methods are appropriate and adequate to determine the annual cost of power and as a basis for the allocation of costs.

The study produced several recommendations, one of which has already been implemented. Of the two remaining, the first relates to the treatment of overheads and in general proposes a more specific application of credits to the cost of power for overheads deferred or recovered. The second recommendation deals with a minor problem in the distribution of costs charged for internal service functions.

The recommendations summarized in the accompanying table should only be regarded as refinements. Carrying these recommendations out should not affect any other recommendations of the Costing and Pricing Study.

<u>RECOMMENDATION</u>	<u>PRESENT METHOD</u>	<u>REASON FOR RECOMMENDATION</u>
1. The overhead study should give full consideration to the following cost-of-power allocation requirements:		
a. A more specific credit to the cost of power for operation, maintenance, and administration costs that are capitalized as overhead.	There are three separate overhead categories, and all accounts in a given category are credited at the same percentage rate.	Using one rate for all categories could result in allocating incorrect amounts to the individual power-costing classification.
b. A procedure for recoverable overheads that ensures credits are applied to the cost-of-power functions which absorbed the cost of the work.	Some overheads recovered are pro-rated over all accounts in two of the capital overhead categories.	All cost-of-power functions that contain the two overhead categories receive credit for some overheads recovered, regardless of where the original cost was incurred.
c. The establishment of guidelines for calculating overheads included in the internal transfer of costs for service functions.	Several methods are used to calculate internal overhead rates.	Without guidelines, incorrect or inconsistent charging of internal services could occur with a resulting distorted allocation of costs.
2. When costs are distributed to accounts through a predetermined distribution rate any minor over-absorptions and under-absorptions should be incorporated as part of the following year's distribution rates. Where the effect on the cost of power or capital is substantial, an adjustment in the current year should be considered.	The treatment varies. In some cases differences are built into the next year's distribution rate, but in others the differences are charged to the annual cost of power.	There is no consistent method, and it is possible for costs that would normally be charged to capital to be charged to the annual cost of power.

II. IDENTIFYING CAPITAL ASSET COSTS

To divide costs equitably between current and future customers, total annual expenditures must be classified as current operating-costs (cost of power) or capital (fixed-asset costs).

Spending for 1975 totalled approximately \$1.8 billion, of which \$1.2 billion was for capital assets. Part of the \$1.2 billion was interest (\$149 million), which was capitalized under procedures discussed in Section VIII. A further \$29 million constituted indirect charges to capital, and their treatment is covered in Section IIIB along with recoverable and internal overheads. The largest share of capital expenditures can be directly identified under procedures outlined in Part A below. The remaining sections of the report deal with methods used to determine the annual cost of power.

A. DIRECT CHARGES TO CAPITAL

Expenditures directly related to the purchase or construction of physical assets are classified as capital. In addition, expenditures for internal service functions are allocated, when practical, to the work unit using the service and subsequently to current operations or capital, depending on the work performed by the work unit. When this allocation is not practical, such expenditures are treated as overhead and allocated between current operations and capital in an indirect manner.

Direct charges to capital are relatively easily identified. All labour and materials for a specific job are charged to a work-order number assigned to a capital project. Appropriate interest and overhead costs are also added to the capital cost before the in-service date of the asset. After the physical asset is put in service, the cost of the asset is charged to the annual cost of power as depreciation over several years.

Exceptions to the foregoing can generally be described as follows:

1. *Materiality*. Where costs are insignificant compared to the cost of keeping appropriate records, a judgemental allocation may be made.
2. *Conservatism*. Where benefits to future customers are doubtful, expenditures are then charged to current operations.

The policies and procedures used in classifying expenditures as applicable to current operations or capital were examined and found generally satisfactory. These policies are to be reviewed in depth in the near future; and for this reason the examination of this area, while complete, was not as intensive as it otherwise might have been. One inconsistency that was noted is the treatment of costs incurred for land held for future use.

While land is being acquired, interest costs are capitalized. If the land is then held for some time before construction starts, the annual carrying-costs, including interest, property taxes, and certain maintenance charges, are absorbed in the cost of current operations. When construction starts, this type of cost is capitalized. The external auditors have recommended examining the charges capitalized for land, because the present practices are inconsistent. The study team considers that interest should be capitalized for the total holding-period, since this is a cost that benefits future customers. The Finance Branch is committed to reviewing this issue and will be preparing a position paper. If that recommends capitalizing interest on land for the whole period from the time of acquisition to the completion of construction, all carrying-charges should be treated in a similar manner.

B. OVERHEADS

Overheads in Ontario Hydro were defined in a 1968 report on overheads as the cost of "administrative activities and/or the supporting services rendered which form part of the cost of doing business but which are not readily identifiable with the operation, maintenance or construction of specific physical assets." The main purpose of accounting for overhead is to determine the portions that relate to current and future operations. A further function is to determine recoverable and internal overheads and their treatment in the process of allocating the cost of power.

The Finance Branch will shortly undertake a study of overheads. This subsection therefore concentrates on the areas that should be pursued in the study to meet the needs of the cost-of-power allocation process.

1. Overhead Application to Current and Future Operations

Ontario Hydro's policy is to charge to current operations the cost of those overhead activities which contribute to the ongoing aspects of the business. Any additional overhead costs incurred as the result of the construction of physical assets are charged to capital.

Current Policy for Capitalizing Overhead

Overhead relating to construction of assets cannot be precisely identified in all cases. The procedure used to determine the division of overhead costs between capital work and operations is to classify the overheads involved with capital work into three cost categories:

Category 1. Expenses relating directly to construction activities, though not to specific assets, are capitalized 100 per cent.

Category 2. Expenses having a significant capital content are capitalized in proportion to the ratio of (1) the amount by which the projected peak load six years hence exceeds the current peak load to (2) the projected peak load six years hence. The objective of this procedure is to achieve equitable allocation of overhead between current and future customers. The six-year period is based on the assumption that average construction lead time is six years.

Category 3. Expenses having a minor relationship with the Capital Construction Program (up to 15 per cent) are capitalized at 10 per cent.

This process is not precise; but it was previously concluded that it led to a reasonable allocation and year-to-year stability, and that added refinement would require extensive and costly record-keeping.

Alternative Methods for Capitalizing Overhead

The 1968 report contained some alternative methods for capitalizing overhead. Briefly, these alternatives can be summarized as:

1. Charge all overhead costs to current operations. Given the size of Ontario Hydro's construction program, this alternative would charge current customers a substantial portion of costs incurred for future customers.
2. Estimate the overhead relating to construction activities. This is a standard accounting-approach that has the disadvantage of requiring periodic estimates or time-sheet and sampling techniques that could lack accuracy or could add to administrative costs.

3. Apportion overhead on the basis of a ratio of construction costs to operating-costs. Either total costs or labour could be used as the basis for the apportionment; but both methods would produce an incorrect result, because the components of cost of the two activities are dissimilar. This method also results in the amount of overhead capitalized varying in proportion to the construction or operational activity in the year. Thus a construction strike would reduce the amount of overhead capitalized, and this might not then be an accurate representation of the actual pattern of overhead incurrence.

Analysis of Current Method for Capitalizing Overheads

The capitalizing of overheads is proper accounting-treatment; however, some questionable areas were found in the current process.

One such area is that only the incremental costs incurred as a result of Ontario Hydro's construction of its own assets are considered when classifying accounts into the three overhead categories. This practice has been derived from the 1968 report. It has resulted in some departments mainly involved in capital work being classified as Category 3, with only 10 per cent of their costs capitalized as overhead. The theory is that the costs of these departments would still be incurred even if the assets were constructed by external firms. The study team agrees with the current practice on the basis that these costs are ongoing as discussed in Section III. However, the question of relating incremental costs to external as well as internal construction should be examined in the planned overhead study.

A second area of concern is that accounts classified as Category 2 are apportioned to current and future operations based on load growth. In the opinion of the study team, this method is not appropriate for the following reasons:

1. Under the current method, with constant load growth, as lead time varies so will the amount capitalized. Lead time is simply a mechanism in the formula; but while possibly having some impact on overheads, a change in lead time would not be proportionate to the change in overhead incurred. Appendix 1 illustrates the effect of the use of an increased lead time on overhead capitalized.
2. Loads do not directly relate to overhead dollars spent for system construction. For the same load, more dollars will be spent constructing a nuclear station than a fossil station; and presumably (although not in proportion) more overhead could be incurred.
3. The calculation of the percentage of costs charged to capital bears no relation to the amount of overhead construction activity of a given organizational unit.
4. The formula uses a projected rate of growth based on past experience and does not recognize forecast load growth.

Approximately \$20 million was capitalized as Category 2 overhead in 1975. Appendix I indicates that a two-year increase in lead time would result in a 25-per-cent increase in the amount capitalized, or (using 1975 figures) \$5 million. If the lead time remains constant, but a hypothetical forecasted growth rate of 5 per cent is used rather than a projected historic rate of 7 per cent, a \$5-million reduction in overhead capitalized could result, based on 1975 data. While this may be a reasonable approximation of the actual changes in cost, the examples provide an indication of the volatility of the Category 2 formula, and the study team considered that this area should be further examined.

Another problem is that the credit for overheads capitalized is applied at the same rate to all accounts in an overhead category. For example, approximately 30 per cent of the costs of accounts in Category 2 is capitalized as overhead. Each account in this category will have varying degrees of operation-related activity, but 70 per cent of the cost of each account will be charged to current operations. The accounts in Category 2 are distributed to four places in the allocation process. While it is possible that the total cost of power would be correct, the application of the overhead credits of a category at the one overall rate could cause distortions in the cost allocated to the various classifications. Four separate overhead rates for Category 2 accounts would minimize the distortion. The cost of this solution, however, might not justify the results; but this can only be decided in the context of the overhead study.

There are also two problems in connection with a correcting-factor used to reduce Category 2 overheads in recognition of construction that is contracted out. The formula used to calculate the current factor is described in Appendix II.

1. The formula does not allow for instances where Ontario Hydro remains the prime contractor and is responsible for items such as engineering and purchasing, but the actual work is performed by an outside firm. An example of this would be the Bruce Heavy-Water Plant units constructed by Lummus. In this case there would only be a partial reduction in overhead. Total overhead capitalized should reflect this situation, and the overheads applied to this type of project should be at an appropriately reduced rate. In addition, if a large portion of a project constructed by Ontario Hydro is contracted out, consideration should be given to adjusting the rate applied to this project.

2. A basic assumption of the formula is that the cost of the project is directly related to the load generated. As previously noted, this is not the case. In addition, the inclusion of load in the formula does not allow for work contracted out for facilities such as transmission lines or the heavy-water plant.

The foregoing leads to the conclusion that revisions to the existing overhead procedures should be considered. With the widespread use of work programs and the computerization of the cost-of-power systems, it might be possible to use work programs to establish overhead rates for each account which reflect the activities related to future operations. At the very least, a separate rate for each overhead-allocation process should be considered for cost-allocation purposes.

As further support for the use of individually calculated overheads, the study team noted that the United States Federal Power Commission in their Instructions for Electric Plant Accounts state that

As far as practicable, the determination of pay roll charges includable in construction overheads shall be based on time card distributions thereof. Where this procedure is impractical, special studies shall be made periodically of the time of supervisory employees devoted to construction activities to the end that only such overheads costs as have a definite relation to construction shall be capitalized. The addition to direct construction costs of arbitrary percentages or amounts to cover assumed overhead costs is not permitted.

The overhead system in use before the present one used several rates, and one of the criticisms was that the total amount of overhead capitalized annually fluctuated considerably. Since the

study team considered that to achieve a proper allocation a number of rates are required, any system designed with multiple rates could be subject to similar criticism. However, there may be other solutions to such problems.

2. Recoverable Overheads

Ontario Hydro undertakes numerous jobs for which costs can be recovered from external parties, such as replacement of poles damaged in traffic accidents, and certain services supplied to municipal utilities, companies, and private individuals. In addition to recovering the direct costs incurred, overheads are also charged for this work.

Current Policy for Recoverable Overheads

Ontario Hydro applies two overhead rates to all recoverable work not covered by existing legislation or special agreements:

1. A specific overhead rate that relates to the group performing the recoverable work is applied to the total of labour and equipment costs.
2. A general overhead rate common to all recoverable charges is applied to total costs. The current general rate is 10 per cent.

Alternative Methods for Recoverable Overheads

To fully recover costs, overheads must be charged on recoverable work. Therefore the alternative methods for recoverable overheads are limited to the number of rates used and their method of application.

One method would be to use one rate for all recoverable work. Another method would be to calculate a separate rate for each organizational unit and include an allowance for general overheads.

The use of one rate would be simple to apply, but would not recognize that labour costs in various parts of the organization are treated differently. For example, the cost of a general foreman may be considered a direct charge if he is associated with only one job. In another case a foreman's work could involve numerous small jobs and his labour cost might be treated as overhead.

A separate rate for each organizational unit with an allowance for general overhead might produce a higher degree of accuracy, but the multiplicity of rates could be confusing. A further danger is that the general overhead might be calculated differently for each rate. Also, there could be a problem in crediting the general overhead to the accounts where the offsetting debit appears.

Analysis of Methods for Recoverable Overheads

The present method of using a specific and a general rate is, in the opinion of the study team, an appropriate way to recover overheads equitably. However, the study team did not consider the mechanism used to credit the overheads recovered to be entirely satisfactory for cost-allocation purposes.

In the examination it was found that some amounts recovered by both the rates are pro-rated over the accounts in Categories 2 and 3 of the capital overhead policy. The effect was to reduce the charge to the cost of power of all accounts in these two categories. The proper treatment would be to credit the amounts recovered to the cost-of-power functions which include the cost of the related recoverable work. In this manner, the costs recovered under specific overhead charges would reduce the cost pool containing the original charges, rather than being spread over all the cost pools that Category 2 and 3 accounts are allocated to in the cost-of-power process.

As a result of the investigations, adjustments were made in 1975 to credit significant recoverable overheads to their source, and changes are to be made in 1976 to identify overhead credits further.

3. Internal Charging of Overheads

Within Ontario Hydro, one organizational unit often provides services to another. For example, the Computer Branch provides service to every branch in the organization. The general practice in Ontario Hydro is to re-allocate only the cost of internal services that have a directly identifiable benefit. The charges for these services are transferred to the group receiving the benefit, and generally include overheads as well as direct costs.

Alternative Methods for Internally Charging Overheads

The two extremes for internal service charges would be not to distribute them at all or to re-distribute all internal services.

If no internal service costs were transferred, the problem of allocating overheads to future operations would be further complicated. It would be necessary to estimate the end use of the service and allocate between current and future operations on the basis of the estimate. Similarly, the costs of these services in recoverable work would have to be estimated or included in the overhead calculation. This method would, however, reduce the number of formal accounting-transactions and eliminate the calculation of the rates required for charging of services.

If the cost of all internal services, including general administration, were allocated to the unit using the service, there would be no overhead to allocate to capital or recoverable work. A similar process would be required, however, in estimating where each portion of the service functions or general administration costs should be charged. In addition to the many estimates required, the accounting-transactions necessary to accommodate the process would be numerous.

Analysis of Method for Internally Charging Overheads

Task Force Hydro's Report Number 5, *Make or Buy*, recommended that

All Hydro service groups charge internal user groups on a basis which recovers the full and true cost of the services rendered, established in accordance with generally accepted accounting principles and practices.

The main reason for this recommendation was to permit a comparison of costs with those in the private sector from a standpoint of productivity and efficiency. It was noted that the costs should include overheads.

The study team concurs with this recommendation, especially from the standpoint that the practice of charging overheads on services rendered between various segments of Ontario Hydro is necessary to obtain an appropriate division of costs between current and future operations and an equitable allocation of current costs. However, many of the organizational units charging overheads use different methods to calculate them. While the use of different methods may be correct, it would seem appropriate to establish guidelines specifying what overheads should be charged and the base used to apply these overheads. It also appears possible that the rates used for internal services could be the same as those used for recoverable work.

A somewhat related problem that should be examined is the overheads or burdens applied to direct labour in the regions. Some work groups build all their indirect time into the burdened direct labour rate, while others charge such time to current op-

erations. For those groups that burden their direct labour, indirect time is charged to capital work. For the other groups, indirect time is charged to current operations and capital is not charged.

The foregoing indicates that internal overheads require examination. A complete study of overheads in Ontario Hydro was included in the planned-work program for the Finance Branch and will soon get under way.

4. Overhead Recommendations

In view of the problems outlined in the foregoing section, it is recommended that

The overhead study should give full consideration to the following cost of-power allocation requirements:

- a. A more specific credit to the cost of power for operation, maintenance, and administration costs that are capitalized as overhead.*
- b. A procedure for recoverable overheads that ensures credits are applied to the cost-of-power functions which absorbed the cost of the work.*
- c. The establishment of guidelines for calculating overheads included in the internal transfers of costs for service functions.*

III. OPERATION, MAINTENANCE, AND ADMINISTRATION

The Operation, Maintenance, and Administration (OM&A) component of the Statement of Operations includes:

1. The annual costs of operating, maintaining, and administering the power system;
2. Grants in lieu of property taxes; and
3. Water Rentals

Grants in lieu of property taxes are covered in this Section, while water rentals are examined in Section IV.

Excluding water rentals, the net OM&A costs of \$302 million for 1975 represent approximately 29 per cent of the total revenue requirement. By 1979 these OM&A costs will have increased more than 60 per cent, but will only represent about 19 per cent of the total revenue requirement, mainly because of the expected increase in fuel costs.

Appendix III provides a breakdown by organizational unit of the OM&A portion of the cost of power. After direct charges to capital are removed, adjustments to gross costs are made for transfers of cost to other parts of the organization, costs recovered from external parties, miscellaneous adjustments, and the portion of cost deferred under the overhead procedures discussed in the previous section. The analysis of the OM&A costs in the following subsections is made in the order presented in Appendix III.

The OM&A components can be generally summarized as follows:

1. Operations

Charged totally to the cost of power.

2. Maintenance

Routine maintenance is charged to the cost of power. If, however, the expenditure is substantial and the maintenance results in increased efficiency, usefulness, capacity, or life of a physical asset, the charge is to capital. Repairs to physical assets that maintain satisfactory operating-condition and do not extend the life of the asset are charged to the cost of power.

3. Administration

These costs can often be specifically identified as pertaining to capital or as current costs. For example, engineering-costs for a planned generating-plant are capitalized. In the instances where a distinction is not possible, the division between the cost of power and capital is presently achieved by classifying the account as a Category 1, 2, or 3 overhead and applying the appropriate percentage splits as previously discussed.

Some costs are incurred that do not provide benefit immediately or all at once, yet are not incurred for a tangible physical asset as commonly defined. For example, the benefits of employee training accrue to the Corporation over a period of time, but the related expenditures basically occur at one point in time.

The current practice is generally to write off costs for this type of expense in the year in which they are incurred. From a cost-benefit point of view, however, it might be appropriate to defer this type of cost and amortize it over an estimated period of benefit.

Costs such as training and computer programs are on-going in that when one program or project is completed it is replaced by another. The study team felt that the deferral of this type of cost would not be good policy. Deferral is contrary to the basic accounting-tenets of conservatism and an ongoing business. In addition to requiring what in some cases would be very judgemental estimates of amortization periods, a policy of deferral

would reduce this type of cost over the first several years after implementation. The cost would then revert to somewhere near the levels prior to the policy change, and the total result would be an increased number of accounting-entries and a degree of uncertainty in the accounts. The higher level of financing required to provide sufficient cash inflow would also partially offset any initial reduction in the costs.

Accordingly, the study team agrees with the current policy of charging Operation, Maintenance, and Administration costs of an ongoing nature to the annual cost of power.

A. EXECUTIVE

The activities of this group relate to the total organization, and cannot be identified specifically as pertaining to current operations or capital assets. Therefore the division of costs between capital and the current cost of power is based on the capital overhead policy. An examination of this area revealed no problems.

B. DESIGN AND CONSTRUCTION

This branch is responsible for the largest share of annual outlays. However, because their work primarily involves capital, the share of cost charged to current operations is very small.

The branch is composed of four divisions, plus an Administrative Department. This department charges its costs to the divisions; and these, in turn, charge their costs, including the administrative overhead, directly to capital or to operating-costs on the basis of direct salaries. Time sheets are used to obtain the distribution of the direct salaries, and an overhead rate is applied to the direct salaries to recover expenses such as indirect salaries and administrative costs.

A significant portion of direct expense is the cost of outside consultants. It would appear appropriate to allocate indirect expense on the basis of outside consultants' cost, as well as direct labour, because administration and indirect salaries relate to both activities. The study team agrees with implementing procedures that provide a standardized approach in the overhead costing of this Branch and the application of overheads to both direct salaries and contracts.

C. OPERATIONS

The Operations Branch, in conjunction with the Regions and Marketing Branch, is responsible for the operation and maintenance of the physical plant required to provide the supply of electricity. The total cost of the Operations Branch is not charged to the current cost of power as the name might imply. In 1975, for example, \$62 million was charged directly to capital. Basically this consisted of costs incurred for plants not yet in service and capital improvements. Costs are also recovered from the Atomic Energy of Canada Ltd (AECL) for the production of heavy water and the operation of Douglas Point and Nuclear Power Demonstration Generating-Stations. Costs of involvement in foreign projects are also recovered.

The review of this branch concentrated on the costing for heavy water, because it is a new area and the accounting is somewhat complex. An outline of the heavy-water costing-methods with the study team's conclusions follows. A review of the rest of the branch costs revealed no major problems.

1. Heavy-Water Accounting: Current Method

Heavy-water plant facilities are used to produce a capital asset for the nuclear generating-plants. Separate accounts are used to record the total cost of heavy-water production, which includes the following components:

1. Operation and maintenance (labour, material, etc.)
2. Overheads (specific, corporate)
3. Fixed charges (interest, depreciation)
4. Energy (steam, electricity)

The operation and maintenance and depreciation do not present any potential cost-determination problems, and therefore have not been documented. The other components require amplification.

Heavy-Water Overheads

The overheads applicable to heavy-water production are determined each year. Two overheads are calculated:

1. *Specific Overhead*. This represents the costs of the support staff and services which are identified with heavy-water production.
2. *Corporate Overhead*. This represents a share of the administrative costs of the complete organization, and not individual groups or types of expenditures. In order for the heavy-water manufacturing-costs to be recorded in the accounting-records as a separate operation, it is necessary to allocate a portion of the corporate overhead to the cost of heavy-water production.

The total cost of heavy-water production is collected in a capital work order. To avoid duplication, the overheads that are normally applied to capital work orders are not applied to manufactured heavy water. In addition, the overhead applied to external purchases of heavy water reflects only the administrative costs involved in the purchase.

Heavy-Water Interest

To collect costs for heavy water on a basis similar to other capital assets under construction, interest on the net book value of the heavy-water plant is included as a cost of producing heavy water. The interest expense is determined by applying the interest rate that is used for construction in progress to the net book value of the heavy-water plant. The net book value of the plant is the initial capital cost plus capital improvements, less the accumulated depreciation.

Heavy-Water Energy Costs

A significant portion of heavy-water expense is the cost of steam and electric power. At the time of the examination, electricity was charged to the Bruce Heavy-Water Plant at direct industrial rates. Steam is obtained from the Bruce Steam Plant and also the Douglas Point Generating-Station. The cost of steam from the steam plant is based on the total cost of production, while steam from Douglas Point GS is costed on the basis of the Douglas Point Agreement, and is related to the equivalent generating cost of Lakeview GS.

2. Analysis

The study team agreed with the approach taken for allocating overheads to the cost of heavy water. The use of the normal overhead capitalization method would not be precise enough for specific production costs. The calculation of a specific and a general overhead rate is consistent with the treatment of recoverable overheads. All heavy water is currently sold to a pool administered by the AECL, and the use of a method similar to recoverable overheads ensures that all overheads are included in the cost calculations.

The team also concurred with the practice of including interest on the net book value of the heavy-water plant as a production cost of heavy water, and note that it is consistent with the addition of interest to assets under construction. If interest were not added to the cost of heavy water, it would be incorrectly included as part of the current year's interest costs. By treating the production of heavy water as capital work, interest is added to the cost of the work order. Because one of the costs included in the work order is interest, a compounding-effect occurs; but this practice is no different from any other application of compound interest, and the study team agrees with the current treatment. The rate of interest to be applied is discussed in Section VIII.

The use of direct industrial rates in determining the electric power cost portion of heavy-water production provided a proper cost for sales to the heavy-water pool and other entities that purchase from the pool. At the time of the examination, however, the direct industrial rates included allowances for equity charges and rate smoothing. These items would constitute the net income of an external organization, and should not have been included in the accounting-transactions, because it is improper to realize income on internal transactions. They should therefore not be included in the amounts capitalized when heavy water is purchased from the pool by Ontario Hydro. The procedure overstated fixed assets, and thereby deferred costs to the future that should have been recovered from current operations. A deduction should have been made to remove the allowance for these items from the rates for all internal use-of-heavy-water cost.

The practice of charging for electricity used internally at rates charged to customers extended to construction projects, transformer stations, areas offices, etc. The study team therefore expressed the opinion that the allowance for equity charges and rate smoothing should be removed, where practicable, from any internal charges for electricity.

As a result of the study team's investigations and a subsequent recommendation from the external auditors, steps were taken to implement this recommendation.

The method for costing steam used in producing heavy water was under review at the time of the study, and therefore was not investigated by the study team.

D. RESEARCH

The Research Division maintains its own job cost system for each project in which it is engaged. Division overheads are included, and the system is used as the basis for charging for services plus direct charges to capital. The study included a review of the job cost procedures, and the study team was satisfied that they adequately meet the criteria for cost determination.

No portion of this division's costs is capitalized indirectly through the overhead procedures, since it is felt that with the exception of directly identifiable charges, the work involved has only a tenuous relationship to capital. For example, the work on improving methods of underground transmission might eventually lead to increased use of this medium, and the research costs would relate to all projects. In addition, there are some programs that never prove beneficial. For others, the period of benefit is uncertain. On the basis of the accounting-maxim of conservatism and the previously stated position regarding ongoing costs, the team agreed with the practice of not capitalizing

research costs as overhead. This position is supported by the Financial Accounting Standards Board in their *Statement of Financial Accounting Standards: No 2*, which favours charging research and development costs to current expense.

E. SYSTEM PLANNING

The System Planning Division is responsible for planning the major power facilities of the Corporation, and is also involved in power interconnection agreements and power sales. Although there is a heavy involvement with capital, this division has no direct charges to capital, and only a minor portion of the total 1975 gross cost of \$4,282,000 is capitalized as overhead. As previously discussed, the basis for this treatment is that the costs of this division would be incurred even if Ontario Hydro did not construct its own facilities. In effect, they are ongoing costs, and the comments made at the beginning of this section regarding ongoing costs apply. The study team agrees with the method of treating the majority of this division's costs as a current year's expense.

F. REGIONS AND MARKETING

This branch is responsible for the maintenance and operation of hydraulic generating and transformer and switching-stations; customer service; electric inspection; load forecasting; various accounting functions; and the extension or modification of region plant. Direct charges to capital for this latter function were \$85 million in 1975. The majority of the remaining costs are charged to the current cost of power (some are capitalized as overhead), and have been examined as part of the Retail Distribution System Cost Study. There were no apparent problems in the methods used to determine the total costs of this branch.

G. FINANCE AND TREASURY

The costs of the Finance Branch and Treasury Division are partially capitalized through the general overhead procedures, with the balance becoming part of the annual cost of power. An examination of the costs revealed no problem areas.

H. PERSONNEL

A number of Personnel costs, such as employee recruitment and training, benefit future operations. These costs are ongoing, however, and should not be deferred.

The Personnel Branch administers a training-program for students and recent university graduates. The Personnel Branch assigns trainees to various parts of the organization, and their costs are retained within the Personnel Branch. This cost is partially capitalized as a Category 2 overhead, and the balance allocated to the cost of power on an indirect basis. The allocation between capital and the cost of power is imprecise, and could be improved by directly charging a share of trainees' costs to the area of the organization to which the trainees are assigned. As trainees' experience increases, their productivity should improve, resulting in an increased charge to the user as time progresses. The unproductive costs would be retained by the Personnel Branch as a corporate charge. The study team is of the opinion that this approach should be further examined, taking into consideration the costs of record-keeping and the degree of increased accuracy that might be attained.

I. COMPUTERS

The Computer Branch is a service group that charges other areas of the organization for services provided.

The charging recovers the direct costs of each individual service, and on the average all computer overheads. The service rates are priced, using as one criterion the rates charged by firms external to Ontario Hydro. Individual jobs are usually charged at standard rates for the services used, but are sometimes priced to reflect exceptional factors such as potential second sales or abnormal training-costs.

There are two main reasons why this charging-approach is used. First, by their very nature, the computer overheads cannot be directly identified with specific services, and thus assignment of overheads would not be a precise process. Secondly, the computer make-or-buy policy requires the costs of internal services to be competitive with the prices of outside firms. These outside firms do not price individual services on a cost basis, and to compare internal fully distributed costs with their prices could result in misleading comparisons.

Because the rates for some computer services may include little or no overhead, other rates must include a greater-than-average overhead. It is therefore possible that some jobs or programs of work are charged less or more than average total cost. This could cause a distortion in the allocation of costs between current operations and capital work. With the constraint of the make-or-buy policy, it does not appear feasible to change the existing methods. In any event, the present methods reflect costs that are reasonably representative of the service provided; and since both current and capital work use a variety of services, it is unlikely that in total the charge to either would be significantly distorted.

In addition to the non-cost aspect of service rates, some jobs will provide benefits in future years. Furthermore, when new services are introduced there are initial expenses for development, and there are fixed charges which are too high for recovery in the first year. The Computer Branch plans on the basis of full recovery over five years as the load on the service grows. An alternative solution would be to defer the computer costs until they can be recovered from the user group. This practice is not advisable, because it would cause fluctuations in total cost and would be contrary to the previously stated position of not deferring ongoing OM&A costs. It is important, however, that the charging for computer services and the costs incurred for the year should match in total as closely as possible. In fact, over the past few years, charges for services have matched total costs fairly closely.

Any difference between the charges for services and costs in total is currently written off to the cost of power at the end of each year, with a portion being capitalized through the general overhead procedures. The difference consists of services that are not presently charged to a specific recipient, such as the Man-power (payroll) System, and the difference between branch revenue and costs in the year. It is understood that all services will eventually be charged to recipients. When this occurs, the remaining difference, if not substantial, should not be written off, but be held for matching with revenues resulting from the rates charged for following years. A specific recommendation about this type of situation is contained in the next subsection.

J. SERVICES

The Services Branch is responsible for a number of diverse functions, such as Supply, Property, and the Corporate Services Division. Various methods are used to distribute the Services Branch costs, including time reporting and space charges.

The review of the branch's costs generally indicated a proper determination of the annual costs. One item was noted, however, that pointed to a problem that could occur in distributing costs when predetermined rates are used.

The Property Division distributes its costs through a time-reporting system. As a result of a decrease in work in 1974, insufficient overheads of the division were absorbed, and \$550,000 was written off as current operating-costs. Since normally 60 per cent of this Division's costs is charged to capital, over \$300,000 more was included in the annual cost of power than would have been if work had not decreased. If the costs benefited future customers, the \$550,000 could have been deferred and built into the following year's distribution rates. Alternatively, an adjustment could have been made to charge a proportionate amount of the unabsorbed balance to capital as overhead. There are a number of areas that distribute their costs between capital and cost of power and the effect of differences in distributed and incurred costs can vary. It is therefore recommended that

When costs are distributed to accounts through a predetermined distribution rate any minor overabsorptions or underabsorptions should be incorporated as part of the following year's rates. Where the effect on the cost of power or capital is substantial, an adjustment in the current year should be considered.

K. GRANTS PAID IN LIEU OF TAXES

Under Section 47 of the Power Corporation Act, Ontario Hydro is exempt from taxation for municipal or school purposes, except for local improvements. However, under the same section Ontario Hydro is required to pay municipalities a grant in lieu of taxes for land and buildings owned by Ontario Hydro. The bases for establishing the assessed values on which grants in lieu of property and business taxes are paid are governed by the provisions of the Act. The grants paid to any municipality by Ontario Hydro must not exceed 50 per cent of the total taxes, apart from local improvement rates, required by the municipality.

1. Present Method

For the most part, taxes and grants are assessed and paid in the current year. Where they are not, the portion to be paid in the following year is estimated and accrued so that the accounts properly represent the cost for that year.

Taxes and grants in lieu of taxes related to assets under construction are charged to capital, while those related to properties in service are charged to the cost of current operations. However, where property is purchased that will not be used for several years after acquisition, the carrying-charges, including property taxes, are absorbed in the annual cost of power during the 'waiting-period'. These costs are offset by any rental revenues. Once construction of a project commences, and throughout the construction period, property taxes or grants are capitalized if the value of property is significant.

2. Analysis

The study team is satisfied that the accrual system ensures an accurate cutoff at the end of each fiscal period, and with the exception of the inconsistency of the treatment of costs incurred for land held for future use (See Section IIA), that costs are being reasonably allocated between capital and current operations.

IV. FUEL COSTS AND WATER RENTALS

There are three basic methods used by Ontario Hydro to generate electricity: hydro-electric, fossil-fired thermal-electric, and nuclear-electric. The costs of fossil and nuclear fuel appear on the Statement of Operations as fuel costs, while water rentals are included with operation, maintenance, and administration costs.

A. WATER RENTALS

Water rentals are payments made under various water-power lease agreements with the Ontario, Quebec, and Dominion governments for the use of water to generate electricity. Payments are also made to Quebec Hydro and the Mississippi River Improvement Company in connection with control dams that improve the flow of water to Ontario Hydro stations. Most of the water-rental payments are to the Ontario Government, and are based on the net energy generated at each station and calculated at rates established by the various long-term agreements. In 1975 water-rental expense amounted to approximately \$14 million.

Because water-rental payments are adjusted by an accrual system so that charges to the cost of power each year relate exactly to energy generated in the year, no more equitable method of determining water-rental costs can be recommended.

B. FUEL COSTS: PRESENT METHOD

For fossil-fired generation, fuel costs are charged to the cost of power on an average-inventory-price basis when the fuel is consumed. Separate inventory accounts are maintained for U.S. regular bituminous coal and U.S. premium (low-sulphur) coal held in bulk storage in Ohio. Bulk-storage facilities for Canadian coal are being established at Thunder Bay. Shipments are made from the bulk-storage locations to the individual station coal piles, for which separate inventory accounts are also maintained. The transfers from bulk-storage coal inventory are charged at the average cost of coal stored at the applicable bulk-storage location. The average costs are calculated monthly on a rolling basis, and include rail and barge freight, and inspection and storage charges, as well as the coal-purchase costs. Average inventory costs are also calculated monthly for each station. These average prices, which cover not only the bulk inventory costs but such additional costs as boat-loading, lake freight, and harbour dues, are used to calculate the cost of coal consumed as reported by the station. Oil is currently consumed at only one location, and is also priced at an average cost. Since natural gas feeds directly from the supplier's distribution system, there is no storage by Ontario Hydro, and inventory accounts are not required. Consumption is costed at the contract price.

For nuclear generation the charge to fuel expense is based on the average price of finished-fuel inventory at the time the reactor is refuelled. Inventory accounts are maintained for uranium concentrate (raw material), refined uranium oxide (work in progress), and finished fuel. In the case of the Nuclear Power Demonstration Generating-Station, where the nuclear reactor is owned by Atomic Energy of Canada Ltd (AECL), steam is purchased from AECL to operate Ontario-Hydro-owned generators. The cost of steam is treated as a fuel cost.

C. FUEL-COSTING ANALYSIS

There are several methods of determining fuel consumption costs that reflect generally accepted accounting-principles. The major alternatives and their applicability to Ontario Hydro were considered in the study. These alternatives are Specific-Unit Costing, Base-Stock Costing, First-In-First-Out, Last-In-First-

Out, and Average Cost. A description of these methods and the analysis of their applicability to Ontario Hydro appears in Appendix IV.

The study team considers average costing an appropriate method for Ontario Hydro to use in calculating fuel costs because:

1. It is the most equitable to both current and future customers;
2. It smooths the effect of purchase price fluctuations;
3. It is equally applicable in periods of inflation and deflation; and
4. It is widely used by utilities and others.

Charging nuclear fuel as cost at the time of loading (which is the present practice) approximates the matching of costs and use when a regular schedule of frequent partial refuelling is followed and the unit is operating at a relatively steady capacity factor. With the on-line refuelling capability of the CANDU system this type of refuelling schedule is followed. However, aberrations from either the refuelling or the operating-schedule will result in a mismatch of fuel costs and fuel use for a given time period. This mismatch can be significant for a relatively short time period such as a month.

An alternative method for charging nuclear fuel costs involves using a burnup rate to relate the quantity of fuel consumed to the measured output of the unit. Although the burnup can only be calculated after the fact, an estimated or prior period's rate can be used to calculate monthly consumption, with any significant variances adjusted after the actual burnup has been calculated. This method relates costs and benefits within a given time period more accurately than does the method of charging fuel costs at the time of loading.

A comparison of the two methods for the year 1974 revealed that a minor increase in costs resulted from adoption of the current method. If a regular schedule of frequent partial refuelling were followed, any difference between the two methods for future years should be negligible. However, the study team is concerned that events may occur that will affect the matching of costs and benefits. It considers that the process should be closely monitored, and adjustments made on the basis of burnup if required.

V. PURCHASED POWER

Purchased power consists of contracts negotiated on a long-term firm basis, and purchases of emergency power and energy to cover short-term deficiencies in Ontario Hydro resources.

Firm purchase agreements provide for specific quantities of power and/or energy to be delivered over specified periods of time, such as weekly or monthly components of the total contractual delivery. In effect the quantities and many of the delivery conditions are set when the agreement is signed. The cost of firm purchased power is based on rates set out in the contract, plus any additional charges such as payments for advancement of capital facilities.

For short-term purchases, the covering agreements do not provide for specific quantities. Instead they make provision for arranging short-term transactions on relatively short notice. In some cases a reservation of capacity and/or energy for a specific number of weeks is made a few weeks or months in advance. Other transactions are arranged on a day-to-day or hour-to-hour basis, when generation is not available or when the cost of the purchase is less than the least expensive generation available.

ANALYSIS

As stated, the rates for purchased power are determined by agreements and contracts. The quantities used are invoiced by the interconnected utilities at these rates, and the invoices are generally recorded in the fiscal year when the purchases were transacted. Because the power purchased is consumed in the current period, the total amount invoiced plus the cost of special facilities is the correct cost for the period. Any accruals required can be processed with a high degree of accuracy.

VI. NUCLEAR AGREEMENT PAYBACK

Under an agreement between Ontario Hydro, Atomic Energy of Canada Ltd (AECL), and the Province of Ontario, the three parties contributed to the capital costs of the first two units of the Pickering Generating-Station, in the proportions 34.6 per cent, 35.7 per cent, and 29.7 per cent respectively. The agreement requires Ontario Hydro to make payments termed 'Payback' to AECL and the Province in proportion to their capital contributions. The payback represents, in a broad sense, the net operational advantage of using units 1 and 2 at Pickering as compared to equivalent coal-fired units.

During 1975, payments to Atomic Energy of Canada Ltd and the Province of Ontario in accordance with the Payback requirements of the agreement totalled \$21 million. Since the requirement to make these payments and the method of calculating them are defined in the agreement, no alternatives can be recommended. The study team is satisfied that this cost is being recorded in the appropriate period, because the amounts paid in the year are related to the benefits realized in that year.

VII. DEPRECIATION

Ontario Hydro's present depreciation practice is to distribute the original cost of capital facilities over their estimated useful lives in a systematic manner. The purpose is to recover cost. Through depreciation charges, funds become available for replacement of assets and for other internal financing. Three separate procedures are currently used to apply this policy for depreciation to major fixed assets, which comprise approximately 98 per cent of Ontario Hydro's total fixed assets in service. These are:

1. The Sinking-Fund Procedure

This involves a constant annual charge which, together with compound annual interest, reaches a total equal to the original cost of the asset at the end of its expected service life. The annual depreciation charge increases as the age of the asset increases.

2. The Straight-Line Average-Service-Life Procedure

This procedure is based on charging an equal portion of the original cost of the asset to operating-costs in each year of its estimated service life.

3. The Straight-Line Remaining-Service-Life Procedure

This procedure, a variation of the straight-line average-service-life procedure, produces an annual depreciation charge based on the undepreciated value of the asset divided by the number of years of remaining service life.

Until 1971, all major fixed assets were depreciated on the basis of the sinking-fund procedure. It was decided to adopt a straight-line average-service-life procedure for all future assets beginning in 1971, based on the perceived need to increase internal cash flows. All major fixed assets in service prior to 1971 receive a different treatment. Fossil and nuclear-electric generating-stations are depreciated on a straight-line remaining-service-life basis, while for the other assets the sinking-fund procedure is retained.

A. MAJOR FIXED ASSETS

An overall assessment of Ontario Hydro's present policy and procedures for depreciating major fixed assets has been completed by the Finance Branch. The results of the study are contained in a report dated June 1975, and the associated recommendations were approved by the Board of Directors for implementation on 1 January 1977.

The report recommended viewing depreciation as a pure item of cost which attempts to reflect the actual benefit provided to customers by assets in service. While depreciation does constitute a source of funds, the study did not consider it to be a financing variable, since corporate policy is to maintain financial soundness through equity charges.

A straight-line basis of depreciation for all major assets was recommended because engineering-studies indicated that the usefulness of, or benefit provided by, all classes of major fixed assets could follow unpredictable patterns over their lives, and that the only rational approach was to assume that benefit was provided uniformly throughout the life of the assets. It was further concluded that accurate forecasts of salvage recoveries, removal costs, or decommissioning-costs are currently not possible, but that when such costs are identifiable and estimable with some degree of confidence, they should be recognized when establishing asset service costs.

Three bases for depreciation were recommended: the group basis, the property basis, and a combination of the two which defines small groups of assets at a property level. This recommendation was made possible by computerization of the depreciation processes.

The current process for the review and implementation of changes to asset service lives in Ontario Hydro was not considered appropriate. Four basic problem areas were recognized in the present process, and a new accounting and administrative process was recommended to eliminate the problem areas.

It was also recommended that the account for Unallocated Depreciation should be closed, and its credit balance be reallocated over the remaining life of the relevant classes of assets.

B. ANALYSIS OF MAJOR FIXED ASSETS

The study team reviewed the depreciation report and the associated recommendations in terms of the criteria outlined in the Introduction for evaluating the alternative methods of determining costs, and concluded that it would result in a more equitable allocation of costs among present and future customers and prove a more practical and flexible system for cost-of-power purposes. The straight-line procedure is the procedure most commonly used by the larger utilities in the United States, by Canadian electrical utilities, and by other suppliers of energy.

The proposed more detailed allocation of depreciation on the basis of smaller groups defined at a property level, making possible property-level identification of net asset values and depreciation charges, will permit carrying out the recommendations of a current report on non-common cost-of-power functions (See Volume 2B). The depreciation study specifically considered the requirements outlined in this report and other material from the Power-Costing Section. The property level identification will also facilitate setting net book values for specific assets being sold, as well as being compatible with cost-centre reporting-requirements.

The Finance Branch also plans a thorough review of specific asset service lives, to be completed in 1976.

C. MINOR CAPITAL FACILITIES

Minor capital facilities, which comprise only 2 per cent of Ontario Hydro's fixed assets and include various types of equipment, were reviewed very briefly by the study team and did not present any problems.

D. LAND DEPRECIATION

A separate study was also undertaken by the Finance Branch to evaluate land-depreciation policies. The policy on the depreciation of owned land, easements, and land-associated assets was approved in February 1975. The basic criteria used to determine whether or not land should be depreciated are:

1. Does the land have an unlimited useful life?
2. Does the land retain its original value?

Affirmative answers to the foregoing questions support the argument for not depreciating land.

This treatment is consistent with general accounting-practice and compatible with the previously established criteria of this study.

VIII. INTEREST

An important cost item in the total cost of power is interest. In essence this item consists of the cost of borrowed funds, reduced by income earned on investments and the amount of interest capitalized. The interest cost included in the cost of power is governed by financial policies and accounting-practices. These policies and practices are outlined in the following subsections.

A. POLICY ON INTEREST COSTS

It is Ontario Hydro's general policy to capitalize the interest related to funds used for assets under construction and to charge other interest to current operations. In this way, present customers are not required to pay the interest cost related to constructed assets which benefit future customers. This policy is consistent with currently accepted practice among utilities.

B. INTEREST COMPONENTS

Interest charged to current operations in 1975 was determined as shown in the accompanying table.

<u>Interest Costs</u>	<u>\$000's</u>
Interest on bonds	410,960
Interest on notes payable	29,407
Interest on purchase agreements	<u>19,499</u>
	<u>459,866</u>
<u>Less:</u>	
Interest capitalized on fixed assets under construction	149,197
Interest on heavy-water production facilities charged to cost of heavy water	18,538
Interest earned on investments	34,049
Net profit on redemption of bonds and sale of investments and foreign-exchange adjustments	<u>4,072</u>
Interest charged to Operations	<u>\$254,010</u>

1. Interest Costs

Interest costs consist of the interest on bonds, short-term notes, the heavy-water-plant purchase agreement, and the head-office lease-purchase agreement.

Interest on bonds is the annual cost of servicing the outstanding bonds payable, and includes interest payments, amortization of bond-discount, amortization of bond flotation expenses, and exchange. Since interest-payment dates usually do not coincide with the fiscal year's end, bond-interest expense for the year is accrued where necessary. For each bond issue the difference between the par value of bonds issued and the sale proceeds (known as discount or premium), plus flotation expenses such as legal and printing costs, is written off proportionally to annual interest costs over the life of the issue to maturity, or to earliest call-date if applicable. Interest on short-term notes similarly includes both interest and amortization of discount.

Interest is paid to Atomic Energy of Canada Limited on the outstanding balance of debt arising from Ontario Hydro's agreement to purchase the Bruce Heavy-Water Plant from AECL at a rate of 7.795 per cent per annum. This is .25 per cent above the composite rate of Dominion Government advances to AECL for building the plant.

2. Interest Capitalized on Fixed Assets under Construction

During the period of construction, expenditures are made on capital work. At any given time the accumulated expenditures for all the capital work, less the value of any portions that have been placed in service, constitute fixed assets under construction. The interest to be capitalized each month is calculated by applying the established rate to this base. Interest is compounded annually; thus interest capitalized in the current year to date is excluded from the base in making the monthly calculation. The capitalization of interest for a specific item of plant ceases when the item is placed in service.

The formula for calculating the rate at which Ontario Hydro capitalizes interest on assets under construction was recently reviewed by the Finance Branch, and the results are contained in a report dated February 1975. The report proposed refinements to the present formula to make it more responsive to changing conditions. It was approved by the Board of Directors and was implemented on 1 January 1976. The basic policy and procedures for calculating the rate of interest to be applied to assets under construction are contained in Appendix V.

Implicit in the present and future policy is the fact that Ontario Hydro places the same value on funds generated internally as on those borrowed externally.

The study team reviewed the abovementioned report and agreed that the refinements result in a more equitable cost allocation between present and future customers.

Section II contains comments on the capitalization of interest on land held for future use.

3. Interest on Heavy-Water Production Facilities Charged to Cost of Heavy Water

The amount of interest added to heavy-water production costs, and thus deferred to future operations, is presently determined by applying the interest-capitalization rate to the net book value of the plant. The study team considers that the rate of 7.795 per cent from the AECL agreement would be more appropriate for Bruce Heavy-Water Plant A. This is currently being reviewed by the Finance Branch, and a position paper will be prepared covering this purchased plant and those now being constructed by Ontario Hydro.

4. Interest Earned on Investments

Interest earned on investments includes short-term investments and deposits in U.S. currency, as well as minor items of miscellaneous interest income and expense. Investment income is calculated on an accrual basis, and includes amortization of premiums and discounts representing the differences between par value and purchase price of bonds purchased as investments.

Miscellaneous interest income results from charging interest on various receivable balances such as mortgages and overdue power bills, and from such other sources as bank deposits and the sale of facilities. Miscellaneous interest expense includes interest allowed on various credit balances such as customer deposits. In 1975 miscellaneous items amounted to a net income of \$1,168,000. Various interest rates are used, and they are reviewed and adjusted periodically. The Finance Branch is preparing a position paper setting the guidelines which should be used in determining the appropriate interest rate to be charged.

5. Net Profit (Loss) on Redemption of Bonds and Sale of Investments

This item consists of the profit or loss on the sale of investments

(other than Hydro bonds) and the write-off of premium or discount, flotation expense and foreign exchange on Hydro bonds purchased for redemption and subsequent cancellation. The study team concurs with the methods used to determine these costs and their inclusion as part of the interest cost.

C. ANALYSIS

With the exception of the question of interest capitalization on land held for future use, the study team agrees with the methods used to determine the various components of interest cost. The areas to be examined by the Finance Branch might provide some refinement to the processes, but will not significantly affect the results.

IX. EQUITY FINANCING

Equity financing is primarily acquired from customers through rates. It is Ontario Hydro's policy that the revenue requirement should include an equity charge sufficient to maintain a sound financial position. The charge consists of the statutory debt-retirement charge plus a possible provision to the Reserve for Stabilization of Rates and Contingencies. This provision is based on satisfying Hydro's financial requirements, giving consideration to the trade-offs between financial soundness, rate increases, capital availability, and the capital construction program.

The Power Corporation Act requires Hydro to charge an annual amount to operations which, together with interest at 4 per cent per annum, will retire debt over a 40-year period. At the year's end, the difference between total cost (including the appropriation for debt retirement) and total revenue is recorded as a provision to, or withdrawal from, the Stabilization Reserve. If revenue exceeds costs, a provision is made to the Reserve; and conversely, if costs exceed revenue, a withdrawal is recorded. The Reserve is part of equity capital; and if the amount recorded at year's end differs from the planned provision, the level of equity capital is affected. The revised amount of equity becomes a matter of consideration in subsequent revenue-requirement forecasts.

ANALYSIS

The amounts of planned provisions to the Stabilization Reserve are discretionary and are a corporate responsibility. The level of these charges is beyond the scope of this study, and accordingly has not been considered by the study team. However, the validity of a provision to, or a withdrawal from, the Reserve as a charge to current customers was examined. It was agreed that it was an item that formed part of the current cost of power for the following reasons.

The share of the total equity charge devoted to debt retirement is required by statute, and this amount must be included in current costs. The chief consideration in setting the rest of the charge is to maintain an ongoing sound financial position, and therefore that part too is included in current costs.

The second reason for regarding a provision to the Reserve as current is related to a major use of the funds to finance expansion of the power system. Viewed in this manner, costs would normally be deferred until the facilities come into service. The position that the provision should be current is related to the existing level of depreciation for facilities built over a period of years. If these assets were to be replaced now, their current cost would be considerably higher owing to inflation. Depreciation based on current value or replacement costs would provide more funds for replacements and system expansion, and probably significantly reduce or eliminate the planned provision to the Reserve. Current-value or replacement-cost accounting is presently not accepted accounting-practice. The concept, however, is generally recognized as valid, and the study team view the planned provision as an acceptable solution to the problem of depreciating costs that do not relate to the asset value. Volume III of the Electricity Costing and Pricing Study is a report of a study conducted by Ontario Hydro on inflation accounting.

X. SECONDARY SALES

All sales of surplus interruptible power and associated energy to other power systems are classified as secondary sales. Although there are some sales to Canadian utilities, the vast majority of sales are exports to the United States. There is no obligation by Ontario Hydro to provide any specific amount of assistance, nor is there any obligation by the U.S. utilities to buy any specific quantities. The economic use of system resources includes marketing generating capacity that is surplus.

The annual revenue recorded for secondary sales is the total of the invoices rendered for the fiscal period. Accruals or adjustments are not normally required, but if needed can be accurately included. The costs associated with the revenue are not segregated from the total costs of Ontario Hydro. Therefore fuel and other costs shown on the Statement of Operations include the costs of both primary and secondary sales. Other sections of this report cover the various cost elements, and there is no need to examine separately the cost elements associated with secondary sales.

ANALYSIS

The only area that causes concern is the exchange of capacity or energy at no charge. This practice could cause variations in the cost of power, because any amount of power and/or energy owed or due at the end of the year will result in a mismatching of costs and revenue. If amounts are owed, costs will be understated; and conversely, amounts due will overstate costs for the period.

Any amounts currently being exchanged are small, and if misstatements of cost did occur they would be very minor. The type of power that involves the largest quantities is not being exchanged at present, and mechanics do exist to permit accruals for this type of power. The procedures used to account for exchange power should be reviewed periodically to ensure their adequacy, and the year's end status of exchange power should be closely examined to ensure that all outstanding amounts are accurately reflected.

XI. CONCLUSION

In general, the methods currently used for determining costs were found to be appropriate. Costs for a year are reasonably related to the benefits received, and with the odd exception are determined in a manner suitable for cost allocation. A number of minor improvements have been suggested in the report and some of these have already been implemented. Others are to be further considered as part of current or planned studies.

APPENDIX I: Effect of Increased Lead Time on Category-2 Overheads

Assume a Category 2 operation, maintenance, and administration account with annual costs of \$100,000 and a constant 7-per-cent historic rate of load growth.

Lead time of 6 years

a) Annual expenditure:	\$100,000
b) The amount of 1 after 6 years at 7% = $(1.07)^6$ =	1.50073
c) Assumed growth over the next 6 years = $1.50073 - 1$ =	.50073
d) Percentage applicable to future operations = c ÷ b =	33.4%
e) Amount capitalized = a × d =	\$ 33,400

Lead time of 8 years

a) Annual expenditure:	\$100,000
b) The amount of 1 after 8 years at 7% = $(1.07)^8$ =	1.71819
c) Assumed growth over the next 8 years = $1.71819 - 1$ =	.71819
d) Percentage applicable to future operations = c ÷ b =	41.8%
e) Amount capitalized = a × d =	\$ 41,800

Increase in amount capitalized per year: \$ 8,400
Percentage increase in amount capitalized per year: 25%

APPENDIX II: Calculation of Factor to Relieve Future Operations of Category-2 Overhead Costs

To recognize that incremental overhead costs will not be incurred in the same magnitude on behalf of construction which is contracted out compared to plant constructed by Ontario Hydro, projected loads are reduced by an amount representing the contracted loads. The amount of the reduction is determined by the following mechanics:

1. Determine from the Capital Construction Program the estimated cost of the project being constructed by contract, e.g. Lower Notch, \$51,000,000.
2. Determine the total cost of the Capital Construction Program during the same period as the construction of the project in (1): 1968 to 1971 - \$1,295,398,000.
3. Determine relief: $\$51,000,000 / (\$1,295,398,000 + \$1,295,398,000) = .039$.
4. Determine the projected growth in primary peak demand for the same period as (1) and (2), a 6.7% average annual load growth over the 4-year period: $(1.067)^6 - 1 = .2962$.
5. Determine the contribution toward the growth in primary peak demand of the project being constructed by contract: $.039 \times .2962 = .0115$.
6. Determine the base for apportioning the costs in Category 2 to future operations:

$$\begin{aligned} \text{Growth in 6 years} &= (1.067)^6 - 1 = .4757 \\ \text{Adjusted growth} &= .4757 - .0115 = .4642 \\ \text{Base} &= .4642 \div .4642 = 31.7\% \end{aligned}$$

NOTE: Since 1968 is the first year that contracts necessitated factoring, the examples used in this appendix are from the calculations for that year.

ONTARIO HYDRO

Summary of Operations, Maintenance and Administration Costs - 1975

5-000

APPENDIX IV: Fuel-Costing Alternatives

There are several methods of determining fuel-consumption costs that reflect generally accepted accounting-principles. The chief alternatives and their applicability to Ontario Hydro are described below.

1. Specific-Unit Costing

This method is appropriate where the identity of individual units can be maintained from the point of purchase or manufacture through to consumption or sale, and where the costs of purchasing and/or manufacturing can be readily associated with the individual unit. Specific-unit costing is not appropriate for a high-volume, homogeneous material such as coal.

2. Base-Stock Costing

This method assumes that a minimum quantity of inventory must always be on hand for the ongoing operation of the business, and that once this minimum inventory has been built up the investment in base stock is fixed and should not fluctuate as prices rise or fall. This method has been used to some extent in the United Kingdom when it reflects the actual physical treatment of inventory. To the extent that Ontario Hydro usually does not completely draw down specific coal piles, the base-stock method would match the physical facts. However, base-stock costing is not normally used in North America, partly because it is not accepted for income-tax purposes in either Canada or the United States. In the U.K., where the method has been used, some costing-difficulties have been encountered when for one reason or another it was necessary to draw down inventory below the base-stock level.

3. First-In-First-Out (FIFO)

This method assumes that units are used or sold in the same order in which they were acquired or manufactured. This reasonably reflects the physical movement of inventory in many businesses. FIFO is accepted for income-tax purposes in both Canada and the United States. FIFO has been criticized during the present inflationary period on the grounds that when the lowest-cost inventory is transferred to cost of sales the resulting profit is overstated to the extent that inventory has to be replaced at higher costs.

4. Last-In-First-Out (LIFO)

As the name implies, this method transfers costs from inventory to cost of sales in the reverse order to which the units or batches of material were acquired or manufactured. Originally some companies in the United States that considered the base-stock method appropriate to their operations chose LIFO as a method that gave somewhat similar results to base stock and was acceptable for income-tax purposes. More recently, some other American companies have converted to LIFO as an appropriate inventory-costing method in a period of inflation. Relatively few Canadian companies have adopted LIFO, because it is not accepted for income-tax purposes in Canada. Moreover, LIFO is not considered an appropriate costing-method in a deflationary period; conversion to LIFO in inflationary periods, with reversion to some other method whenever inflation is reversed or considerably reduced, is not acceptable in terms of consistency.

The intended effect of LIFO costing is best realized where the consumption of fuel (or other materials) and its replacement proceed at a relatively matched pace. Erratic fluctuations in fuel costs can result where such matching does not occur. For example, in a period of rising fuel prices, inventory consumption

that exceeds the latest purchase (drawdown) will produce a decrease in fuel costs per unit. A large drawdown could decrease fuel costs to the level of much earlier purchases. In Ontario Hydro, a significant portion of the fuel consumption occurs during the winter months when no lake shipping takes place, resulting in substantial inventory drawdowns. These fluctuations and those caused by the effect of spot purchases at above-average prices cause distortions more in monthly and inter-plant cost comparisons than in the total annual fuel cost. However, if supply problems result in a substantial drawdown of inventories over the year, the intended effect of LIFO costing can be distorted even in terms of total annual fuel costs.

A major benefit of LIFO is the tax advantage in a period of rising prices but in Ontario Hydro income tax is not a consideration. However, increased investment in fuel and other inventories because of rising prices must still be financed. Under present practices the additional funds for an increase in inventory are provided, as for an increase in any other asset, from the pool of funds that is partly generated internally and partly borrowed. Insofar as any increased demand on the pool of funds necessitates additional borrowing, the cost thereof is reflected in an increase in interest expense. While adoption of the LIFO method of inventory valuation would provide additional funds to at least part cover the increased cost of replacing inventory, the study team does not believe it would be appropriate to select a method of cost determination on the basis of an ability to increase the flow of funds.

LIFO's other major advantage is the reflection of current value in the costs. If fuel prices rise, LIFO will immediately reflect this as an increase in costs. The fluctuation of inventory levels effectively precludes its internal or monthly use. However, the annual calculation of fuel costs would appear to be a way to institute LIFO and remain within generally accepted accounting-practice. A disadvantage of this approach would be that internal or monthly figures could not be reconciled with the total annual fuel cost. Furthermore, a large decrease in annual inventory could still adversely affect fuel costs. The benefits of LIFO could be best realized through the use of replacement costs, but this is presently not an accepted accounting-practice.

In summary, then, LIFO has certain disadvantages when applied to the complex pattern of purchases, trans-shipment, and consumption that exists for fuel inventories at Ontario Hydro. However, these problems would not exist if LIFO were only used to establish the revenue requirement. LIFO is rarely used by Canadian corporations, and its adoption could be considered a departure from the policy of selecting methods of cost determination on their own merits rather than their ability to affect the flow of funds.

While we do not rule out further consideration of the applicability of LIFO costing in Ontario Hydro, consideration of LIFO (or replacement costs) should be given within the broader context of inflation accounting. Any consideration of cost determination in the context of inflation accounting is outside the scope of this study, since it would require a review of such alternative techniques as general-price-level adjustments and current-value accounting that have not yet been accepted within the body of generally accepted accounting-principles.

5. Average Cost

Apart from its practical advantages in many applications, use of the average-cost method is based on the theory that an inven-

tory is an entity, and when a part of the entity is used, a proportionate part of the cost of the entity should be transferred to cost of sales; similarly, when additional material is added to the entity, the cost of the addition becomes part of the total cost of the entity. This concept is particularly applicable to an inventory of homogeneous material, such as coal, where the identity of specific units or batches of material cannot be (or is not) maintained. In terms of annual costs, the average-cost method reflects the effect of the most recent purchase price immediately, but not as much as LIFO or replacement costing would. The higher the rate of inventory turnover, the better the recent purchase prices will be reflected in the average cost. Generally, Ontario Hydro's electricity rates only change once a year. This reduces the difference between LIFO, and average cost, since over a year there is a great turnover of fuel inventories. This means the average-cost method reflects costs that are relatively current.

The average-cost method, by its nature, has a smoothing-effect on costs. In a year where there is, for some reason, a net draw-down of inventory, the costing of consumption does not suddenly revert to much earlier unit values, as can happen under either the LIFO or base stock methods. The average-cost method also smooths the erratic cost fluctuations that can occur with the LIFO method. Even where the effects of these fluctuations on annual costs are minimal, their effect on monthly and inter-plant cost comparisons must be considered in assessing the various inventory-costing methods. In these terms average costing has a definite advantage. Although average costing does have the effect of collecting from current customers some of the funds required for inventory replacement at higher replacement prices as well as the cost of financing the remainder of the increased funds, this effect is less pronounced than it would be under either LIFO or replacement costing.

1. The interest capitalization rate shall be calculated by weighting the average interest cost of bonds issued in each of the preceding three years by the percentage age distribution of the expenditures carried in plant under construction and rounded to the nearest 1/10 of 1 per cent.
2. The interest-capitalization rate shall be reviewed in March and September of each year; and if the calculated rate fluctuates by 1/4 of 1 per cent or more from the existing rate at the time of review, then the required changes shall be implemented on the following July 1 and January 1 respectively.
3. An analysis of the age distribution of the dollars included in the plant-under-construction base shall be carried out every year for application in the September review of the interest-capitalization rate; and when the three-year period currently used for calculating the interest capitalization rate accounts for less than 90 per cent of the interest-attracting base, the calculation of the interest-capitalization rate in accordance with item (1) above shall be based on the preceding four years.
4. The average bond-interest cost shall be the weighted average cost, including any discounts or premiums, flotation expenses, and the compounding-effect of semi-annual interest payments.

ELECTRICITY COSTING AND PRICING STUDY

VOLUME IIB
REPORT ON ALLOCATION OF COSTS

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I. INTRODUCTION

The operating-costs of Ontario Hydro are accumulated by organizational unit and type of expense for control and financial-statement purposes. These costs are then allocated to the various costing-categories according to cost-allocation policies and procedures. The current cost-allocation policies are primarily based on the results of a study implemented in 1966. Specific procedures have been changed where required, but the underlying philosophy has remained unchanged since that time.

The policies and procedures for allocating costs to the costing-categories were reviewed in the current study. Historically costs have been allocated to common, non-common and retail-distribution functions. The common costs generally are those allocated to all customers on a standard basis; non-common costs are those of providing facilities on a more specific basis to those customers requiring them; and the retail-distribution costs are those required to provide distribution facilities to customers served directly by Ontario Hydro.

Separate studies were undertaken of the non-common and retail-distribution cost allocations. The rest of this report describes the allocation system that results from the recommendations of these studies. The full reports of the two studies, containing their detailed recommendations and comparisons between the proposed and current procedures, appear as Supplements I and II.

II. OBJECTIVE OF THE COST-ALLOCATION SYSTEM

The object of the cost-allocation system is to allocate costs in a way that reflects how they are incurred, in order to establish class revenue requirements. This requires the cost in any category to reflect the cost incurred by the Corporation to provide that category of work. It also entails supplying wholesale power at a similar cost for a similar type of service. The practical way of achieving this is through cost pooling. Costs are pooled according to various functions performed by the system. These costs then form the basis of pricing to customers on a pro-rata basis according to use.

III. COSTING-CATEGORIES

The costing-categories or functions are used to accumulate the cost of facilities that are relatively standard in their nature and quality throughout the province. The proposed functions for allocating costs are as follows:

A. BULK POWER

This would consist of all costs required to serve customers at the bulk-power level. The common physical point of division between facilities considered as providing all customers with power at the bulk level and those which do not accommodate everyone to the same extent, but provide more of a specialized service, would be the high side of the 230-kilovolt or 115-kilovolt transformer stations which step power down to voltages below a nominal 115-kilovolt level. The 230-kilovolt and 115-kilovolt lines would be considered as serving an integrated grid function for the benefit of all customers. The bulk-power function would include the cost of generation, transmission down to the 115-kilovolt level, transformation at the grid voltages, and the cost of providing equity for the wholesale system. It would be allocated to all customers on the basis of their demand and energy use, with one minor exception. The exception applies to administrative costs which relate to a group of customers; these would be allocated to the applicable customers at a standard rate applied to their demand.

B. METERING

This function would contain the cost of metering for billing-purposes. Since metering is essential to the operation of the system and all customers must be metered, the cost would be allocated to all customers, based on their demand.

C. DISTRIBUTION

This function would contain the cost of all lines emanating from transforming-stations at voltages less than 115 kilovolts which are not defined as specific facilities (see below). The cost of this function would be allocated to all customers, based on their demand. As a result of this allocation, there would be no benefits or disadvantages because of a wholesale customer's location relative to grid facilities.

D. TRANSFORMATION I

This function would contain the cost of transforming to levels below 115 kilovolts but above 20 kilovolts, excluding costs of specific-facility stations. It would be allocated to all customers using the service at a standard rate applied to their demand.

E. TRANSFORMATION II

The cost of transforming from above 20 kilovolts to levels below 20 kilovolts, excluding costs of specific-facility stations, would be contained in this function. The cost would be allocated to all customers using the service at a standard rate applied to their demand.

F. SPECIFIC FACILITIES

This function would contain the cost of all distribution and transformation facilities located within customers' boundaries for their sole benefit. The cost would be allocated to customers using specific facilities, based on the original cost. The main premise in designing this allocation policy was that either any distribution facility used specifically for a single customer and within its boundaries should be owned by the customer, or else the full cost of providing the facility should be recovered from the customer.

G. RETURN ON EQUITY

Wholesale customers accumulate equity in Ontario Hydro through debt-retirement charges. Each customer's equity reflects its contributions to the equity financing of Ontario Hydro, and the amount depends upon the size and age of the customer. A return is applied on the accumulated equity of each wholesale customer. The cost of providing this return would form part of the bulk-power function, since all customers are considered to share equally in its benefits. Return on equity is being phased out over a period ending in 1978.

H. RETAIL DISTRIBUTION

The costs of providing energy distribution at the retail level to customers Ontario Hydro serves directly with lower demands than the large-user category are currently allocated to the retail-distribution function. This practice would not change; costs in this function would continue to be recovered through the retail rates.

IV. ALLOCATION OF OPERATING-COSTS TO COSTING-CATEGORIES

Various methods are recommended for allocating operating-costs to the power-costing categories or functions, since no single method could apply to all situations.

A direct allocation would continue to be used when the costs could be directly related to a specific power-costing function. Examples would be fuel, power purchased, nuclear agreement payback, and secondary revenue, which would all be allocated to the bulk-power function.

Where costs cannot be readily identified with a function, they can usually be identified with one particular class of asset. These are termed property classes, and are broad classifications such as thermal generating-stations and high-voltage transmission lines. Where this mechanism is used, costs are first collected and allocated according to the property class to which they are related. The costs identified with each property class are then pro-rated over the cost-of-power functions according to the functional use of the assets. Plant accounting-records provide the necessary data for this allocation, in the form of capital values of assets classified by property class and broken down by function. This process forms an important part of the allocation of depreciation, interest, and operation, maintenance, and administration costs, and would remain unchanged.

Two cost items would be allocated using other procedures. The equity charges would be allocated between the bulk-power and the retail-distribution systems according to the proportion of current capital expenditures on the wholesale and retail systems, with a minimum requirement to allocate to each system at least the requirements for debt retirement. Return on equity is currently allocated to wholesale customers based on their equity balances, with the cost of this return allocated to the bulk-power function. For this latter allocation, no change is proposed.

The rest of this subsection provides details of the proposed allocation of operating-costs, while Figure 1 summarizes the process.

A. FUEL

B. POWER PURCHASED

C. NUCLEAR AGREEMENT PAYBACK

D. SECONDARY REVENUE

These items of cost are related to the supply of bulk power, and would therefore be allocated directly to the bulk-power function.

E. EQUITY CHARGES

The policy of Ontario Hydro for equity charges is to provide funds internally for expanding the system while ensuring that the corporate financial position remains stable and that debt is fully retired within the required forty-year period.

It is proposed that equity charges should be allocated between the wholesale and retail systems so as to reflect the spirit of this policy. The expansion on each system would become the primary basis for the allocation, with a secondary requirement to ensure retirement of debt over a forty-year period. This would be achieved in two stages: first the overall allocation between the two systems would be made, and then the debt-retirement requirements would be checked to ensure they were fully met.

1. Allocation of Total Equity Charges

Since the primary aim of the equity charges is to generate funds internally to help finance the capital construction program, the allocation between the two systems would be based on a formula which took into consideration the capital expenditures and internal cash flows relating to each system.

Specifically, the allocation would be determined through the use of cost data that reflected the net capital expenditures less depreciation for each system. The total equity charge would then be pro-rated over this cost data.

2. Allocation of Equity Charges

The equity charges applicable to the wholesale system are allocated entirely to the bulk-power function. This reflects a long-standing policy that equity should be held in the Ontario Hydro system as a whole, rather than in specific assets. Any allocation to specific wholesale functions would be contrary to this policy, and would also involve a complicated procedure of attempting to associate equity financing with individual facilities. The current procedure also allocates costs fairly, since the other wholesale functions receive a higher interest charge to compensate for the lack of an equity-financing charge.

The retail equity charge is allocated to the retail-distribution system.

3. Minimum Debt-Retirement Charge

A minimum debt-retirement charge is set by the Power Corporation Act as the amount required to retire debt over a forty-year period. For purposes of allocation, this charge is determined for each system as a minimum charge on the basis of the debt and equity in the systems. In effect the formula applied for determining the total minimum equity charge is duplicated for the wholesale and retail systems. The debt-retirement charges consist of two components, interest and provision, and are allocated between the systems according to their effect on these components, as follows:

1. *Interest.* The interest share of the debt-retirement charge is pro-rated between the two systems on the basis of the unmatured equity in each system. Unmatured equity is the accumulated debt-retirement provision applicable to the total debt incurred in the previous forty years. The forty-year period corresponds to the sinking-fund term used in calculating the annual charge for debt retirement.

2. *Provision.* The provision share of the debt-retirement charge is pro-rated between the wholesale and retail systems on the basis of an estimate of the long-term debt on each system. This debt is defined as the net book value of the assets, less contributions from the Province of Ontario to assist rural construction, less matured equity.

3. The amount applicable to a system as calculated through this process replaces the amount calculated through the allocation of total equity charges only if the debt-retirement charges are higher.

4. Provision to the Reserve for Stabilization of Rates and Contingencies

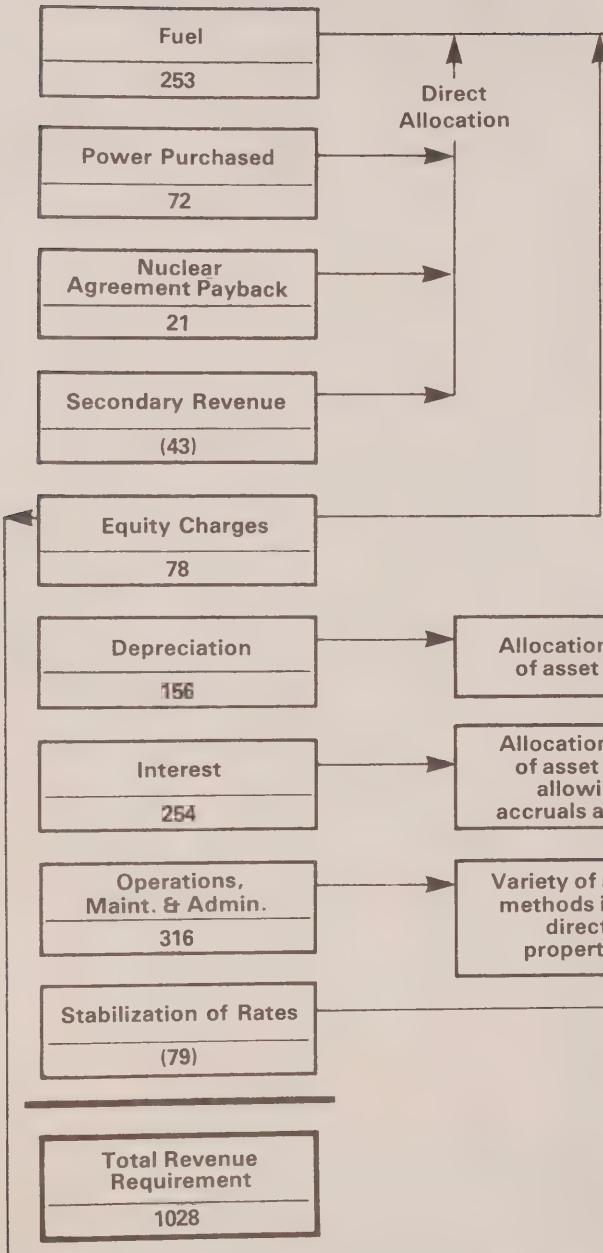
The other share of equity charges consists of provisions to the Reserve for Stabilization of Rates and Contingencies. Combining the allocation of total costs with the revenue received from customers yields a balance which is transferred to the Reserve for Stabilization of Rates and Contingencies. The balance has three components:

1. An amount is allocated to the general section of the reserve to match the wholesale costs for the year with the wholesale revenue.

PROPOSED COST OF POWER ALLOCATION PROCESS

MILLIONS OF DOLLARS
BASED ON 1975 COST OF POWER

STATEMENT OF OPERATIONS



COSTING FUNCTIONS

2. An amount is allocated to the retail customers' portion of the general section of the reserve to reflect their contributions to that section.
3. The surplus or deficit on the direct industrial and rural customers is transferred to their respective sections of the reserve.

This policy was recently approved for introduction in 1976, and no further changes are proposed.

F. DEPRECIATION

Records of depreciation are maintained by property class. The expense identified with each property class is pro-rated over the cost-of-power functions according to the functional use of the assets. Plant accounting-records provide the necessary data for this allocation, in the form of depreciation recorded by property class, plus the capital values of assets classified by property class and broken down by function. This process would not change.

G. INTEREST

The interest costs applicable to the various costing-functions vary as a result of the differences in their debt-financing requirements. Accordingly, interest is allocated to the various functions in proportion to the debt attributable to each function.

Interest is first allocated between the wholesale and retail systems. The net book value of the fixed assets in each system is obtained. These figures are increased for each system by the value of accounts receivable and inventories, and reduced by the amount of equity financing associated with each system. Interest costs are then allocated on a pro-rata basis between the two systems. The share for the retail-distribution system is directly allocated to that function, while the wholesale-system portion requires a further step.

The interest cost of the wholesale system is at present allocated to the various functions on the basis of the net book value of the assets in each function. It is proposed that interest should be allocated to the wholesale functions on the net book value of the assets, less an allowance for any equity financing contributed by a function.

H. OPERATION, MAINTENANCE, AND ADMINISTRATION

Various methods are now used to allocate operating, maintenance, and administrative costs. Each type of cost is analysed, and an appropriate allocation process is determined within the limits of practicality. The procedures can be listed as follows:

1. Where possible, costs are directly allocated to one of the costing-functions.
2. Where costs cannot be allocated directly to a function, but can be identified with a property class, they are allocated to functions through the property-class allocation process explained earlier in this section.
3. Any remaining costs applicable only to the wholesale system are either pro-rated over the operating and maintenance costs of the wholesale system, identified by property class, or allocated to the wholesale-cost category of administration.
4. Costs related to an activity involving both the wholesale and retail systems are allocated between a wholesale cost category of administration and the retail system proportionately, on the basis of various statistics which provide a reasonable indication of the relative share of the cost involved. At pres-

ent certain costs of administering the area offices are allocated between the two categories on the basis of the work reported by area employees through their distribution of direct labour costs. It is proposed that this allocation should be based on total direct cost.

5. The costs accumulated in the wholesale cost category of administration are allocated amongst the wholesale functions on the basis of the operating, maintenance, and administrative costs allocated to the functions.

V. EFFECT OF PROPOSED ALLOCATION SYSTEM

Changes in costs allocated to customers as a result of the proposed allocation system were calculated on the basis of the cost of power in 1975. The calculations were made only on the basis of the changes recommended in this report, and therefore do not reflect any other recommendations of the Electricity Costing and Pricing Study.

The effects of the proposed changes in the allocation system on customer class costs are as follows:

\$ (Thousands)	1975 Cost of Power		
	Municipalities	Industrial	Direct
Present method	653,918	120,734	253,041
Proposed method	650,681	117,794	259,218
Increase (Decrease)	(3,237)	(2,940)	6,177

SUPPLEMENT I: Report on Determination and Allocation of Non-Common Function Costs

I. INTRODUCTION

The Non-Common Functions represent the use of facilities which are supplied by Ontario Hydro to its customers on an 'as-required' basis. In other words, they are the facilities which are not supplied or billed to all customers as common bulk-power functions.

There has been concern in Ontario Hydro over the validity of rates charged for non-common functions. In addition, the Provincial Government, Task-Force Hydro, the Ontario Energy Board, municipal utilities, and others have made recommendations and proposals which could have an effect on the non-common functions in the cost of power. In particular, the recommendations that indicate to what point Ontario Hydro should be providing facilities for supplying power on a bulk basis have an important effect on the non-common functions. As a result of Ontario Hydro's concern and the recommendations and proposals of these other bodies, the study upon which this report is prepared was undertaken.

The terms of reference for the study specified an investigation aimed at improving, wherever possible, Ontario Hydro's costing-procedures related to the non-common functions. To be included were an analysis of the current costing-practices for non-common functions and an evaluation of the need to make these charges through the normal billing-process.

The study was mostly carried out in 1974, with a draft report prepared in January 1975. Approval of the report was delayed to obtain the comments of the Ontario Municipal Electric Association (OMEA) and the Association of Major Power Consumers of Ontario (AMPCO). The draft has been discussed with AMPCO and the Power-Costing Committee of the OMEA, and both associations indicated a desire to review the study in the context of the overall results of the Costing and Pricing Study.

As a result of the study and with consideration given to external views, recommendations have been formulated which will establish a basis for determining the cost to be assigned to the non-common functions. The rest of this report presents these recommendations, along with recommendations for allocating non-common function costs fairly, and the underlying reasoning.

A glossary of the terms used in this supplement is provided in Appendix II.

Summary of Recommendations

The accompanying table summarizes the recommendations and compares them with present procedures.

SUMMARY OF RECOMMENDATIONS

RECOMMENDATION

1. For purposes of power costing, the point of division between the common functions (bulk-power system) and non-common functions (distribution system) should be defined as the high side of the transformer stations which step power down to voltages below a nominal level of 115 kilovolts.
2. All common functions, with the exception of specific administration costs, should be allocated on a uniform basis.
3. The non-common facilities should be reclassified under the functional groupings of Metering, Distribution, Transformation, Specific Facilities, and Return on Equity.
4. The full cost of metering should be identified as one function and allocated on the basis of customers' loads.
5. All lines emanating from transforming-stations at voltages less than 115 kilovolts which are not defined as specific facilities should be considered as serving the distribution function.
6. The costs of the distribution function should be allocated as a common cost to all customers.
7. Losses from the grid and non-specific facility distribution system should be allocated to all customers as a common cost.

CHANGE FROM PRESENT METHOD

At present the division between common and non-common stations is defined as 115 kV. An estimated split is made between the common and non-common functions when a station transforms from above 115 kV to below 115 kV, whereas the recommended method treats the whole station as a non-common function. Furthermore, transmission lines below 115 kV will be transferred to non-common functions.

The allocation of radial lines costs will no longer allow for differences between the loads and miles of line of different customer classes.

A change in name of low-voltage Radial lines to Distribution.

The metering-costs included in the costs of Stage-II Transformation will be removed and pooled with other metering-costs.

The low-voltage radial lines will be defined as Distribution. The present radial-line cost pool includes costs for common functions and for low-voltage lines.

The allocation of these facilities will change from a kilowatt-per-mile basis to a kilowatt basis.

No change.

REASON FOR RECOMMENDATION

The high-voltage transformer station is the only physical point where facilities can be split between those that are common to all customers and those that are not.

Facilities above the dividing point are considered as serving customers on a common basis, with their costs being shared equally.

The title Distribution better describes the service provided.

To identify meter costs fully and permit allocating them consistently.

Since the low-voltage lines do not serve all customers to the same extent, they are a non-common function.

This eliminates the advantage or disadvantage of location relative to grid facilities. Since the costs and milage factors will be greatly reduced from their present levels, the impact will be slight.

The present method allocates costs correctly.

<u>RECOMMENDATION</u>	<u>CHANGE FROM PRESENT METHOD</u>	<u>REASON FOR RECOMMENDATION</u>
8. The costs of transformation to below 115 kilovolts but above 20 kilovolts should comprise Stage I, and the cost of transformation to 20 kilovolts and below should comprise Stage II.	The dividing-point is now 10 kilovolts	The recommended dividing-point more truly reflects the cost characteristics of the various levels of transformation.
9. The cost of transformation losses associated with non-common facilities should be included in the charges for transformation.	The cost of these losses will no longer be absorbed by all customers on the basis of their levels of demand and energy.	To ensure that allocated costs reflect the cost of service provided.
10. Specific Facilities should be defined so as to include all distribution and transformation facilities located within customers' boundaries for their sole benefit. For these purposes, the Power District is to be considered the geographical area not within the boundaries of any municipal utilities.	Specific Facilities will include transforming-stations, whereas the function previously only included lines. Also, specific facilities in the Power District will now be recognized.	All facilities serving only one customer will receive a standard treatment, those in the Power District being handled in exactly the same way as the ones in municipalities.
11. Municipalities should be strongly urged to assume ownership of existing facilities operating below 115 kilovolts when those facilities are within the boundaries of the municipality and are used exclusively by the municipality.	Ontario Hydro owns some of these facilities and charges the municipalities on the basis of the capital cost of the facility or kilowatts used.	These facilities serve a distributing-function, which is the responsibility of the municipalities. Municipal ownership would provide operating-advantages for both parties. Moreover, the pooling-concept does not permit a precise reflection of the costs incurred for each individual facility.
12. Interest costs of the non-common functions should be calculated on the net book value of the non-common assets at the average long-term borrowing-rate.	The interest assessed to non-common facilities will no longer be reduced by the benefits of the internal financing provided through equity funds.	Since equity payments have not been included in the rates for non-common facilities, the should not receive the advantage of funds provided through these payments.
13. The non-common facility costs should include a share of the general administration costs.	The non-common facilities are not now assessed for administrative costs.	Non-common facilities incur further administrative costs, and those should be reflected in the cost of the facilities.
14. Except for interest and overhead costs, all non-common facility costs should be determined as at present.	No change.	These costs are now being allocated fairly.
15. The costs for a specific facility station should be more than 25% higher than the standard charge for the appropriate level of transformation.	Transformer and distributing stations are not costed on a specific basis.	The impact of recommendation 10 on some municipalities is expected to be excessive.

II. SCOPE OF STUDY

The following costing-principles were investigated and reviewed:

1. The criteria used, or to be used, to determine the split between facilities which serve the wholesale function of generating and delivering bulk power and thus serve customers in common, and those non-common facilities which serve customers according to more local needs, such as to meet local transformation or subtransmission requirements.
2. The criteria used, or to be used, to determine which facilities are provided for the specific benefit of an individual customer.
3. The principles and practices used to determine and allocate the costs associated with various types of non-common facilities.
4. Equitable means of recovering costs for both jointly and specifically used facilities.
5. Accounting-methods which when consistently applied would provide appropriate book values for use in allocating costs.

III. COMMON VERSUS NON-COMMON FUNCTIONS

Certain of Ontario Hydro's costs are considered as incurred on behalf of all customers, and are allocated to them on a common basis. Other costs are considered as incurred for the specific use of certain customers or classes, and are allocated to them on a more specific basis. The division between those costs considered common and the more specific ones should come at such a point that it provides for a fair allocation of costs to the customer classes.

The criteria used to define the point of division between common and non-common facilities can be listed as follows:

1. It should be a physical point that can be easily identified.
2. It should reflect the actual planning and working of the system, and be adaptable to any changes in the system operation.
3. If possible, the point should be truly common to all customers, and so do away with the need for discounts from the common rate.
4. It should allocate costs fairly among the customers.

Examination revealed that the one common physical point of division between those facilities which serve everyone in common and those which do not is the 'high side' of the 230-kilovolt or 115-kilovolt transformer stations which step power down to voltages below a nominal 115-kilovolt level.

The present power system uses a 115-kilovolt and 230-kilovolt integrated grid; and the choice of 115 kilovolts as a dividing-point recognizes this physical characteristic, while not differentiating in costs to the customers because of their location on the grid.

If the cost of power is to be allocated fairly, the costs for the non-common facilities must be recovered in a more specific manner.

Hence it is recommended that

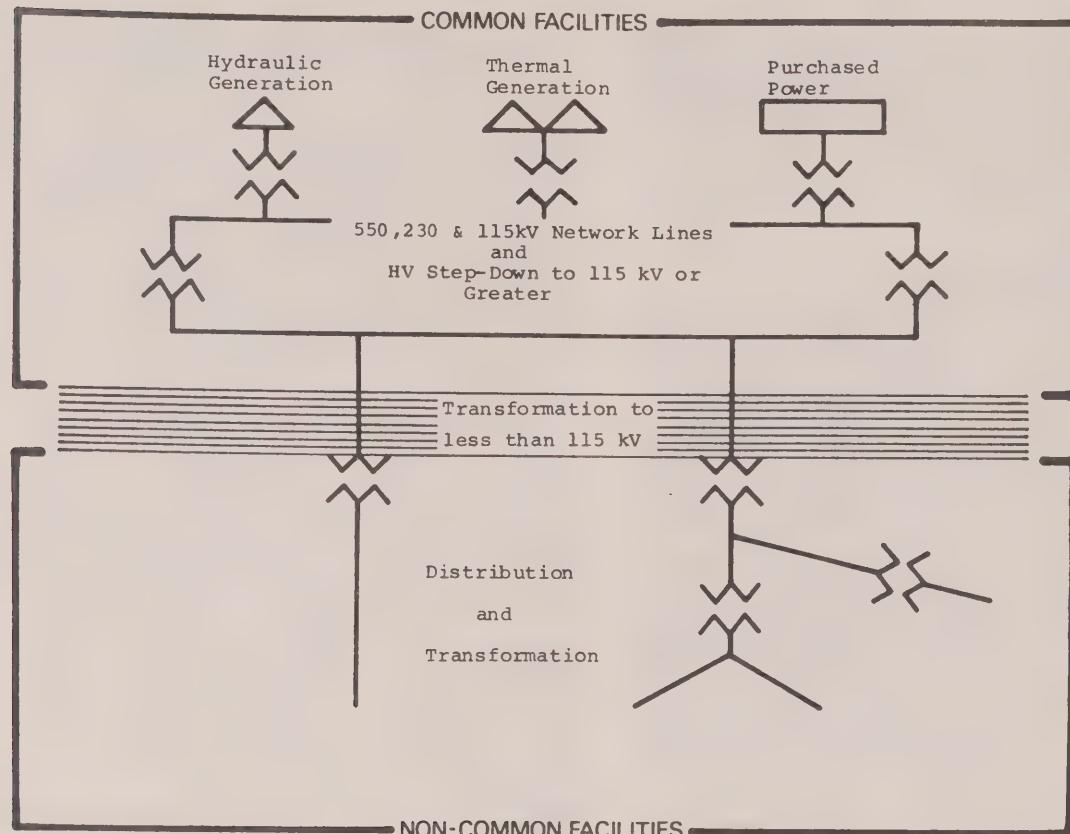
For purposes of power costing, the point of division between the common functions (bulk-power system) and non-common functions (distribution system) should be defined as the high side of the transformer stations which step power down to voltages below a nominal level of 115 kilovolts.

This recommendation is for costing-purposes only. It is not meant to imply that this is a desirable division for facility ownership. The grid contains increasing amounts of 230-kilovolt transmission, and a change in the division point to 230 kilovolts might eventually be warranted. If this happens, it will only be necessary to establish a non-common transformation function to include transformation below 230 kilovolts, and to treat 115-kilovolt lines as a non-common function. For the present, however, the recommendation would continue a uniform cost of power for all service supplied at voltages of 115 kilovolts and above, while allowing for more specific costing-methods below this point.

The proposed split between common and non-common facilities for power-costing purposes is shown in Figure 1.

Figure 1

ILLUSTRATION SHOWING THE SPLIT BETWEEN COMMON AND NON-COMMON FACILITIES



IV. COST-OF-POWER FUNCTIONS

The cost of power is at present allocated to various functions, some of which are common to all customers or to all customers within a customer class, while others are not. The functional categories and their classifications can be summarized as

1. Common Functions

- a. Common to all customers
 - Demand
 - Energy

- b. Common to all customers in a class
 - Specific Administration
 - Radial Lines

2. Non-Common Functions

Transformation I

Transformation II

Meters

Specific Facilities

Return on Equity

3. *Retail Distribution Function*

A. COMMON FUNCTIONS

The common functions serve all customers, and are allocated to the customer classes uniformly, with some costs applied on a demand basis and some on an energy basis. There are at present two exceptions to the uniform allocation of common functions:

1. *Specific Administration Costs*. Some administration costs are incurred for the benefit of one class of customer. They are only allocated to the applicable customer class.
2. *Radial-Line Allocation*. Use of radial lines differs significantly between customer classes. This has resulted in the recognition of both distance and demand in allocating these costs.

One effect of the first recommendation is that the radial-line cost pool would be divided: 115-kilovolt lines and above would be classified as a common function, while lines below 115 kilovolts would be included in the non-common functions. Because the lines at and above 115 kilovolts are deemed to serve the system as a whole, it is recommended that

All common functions, with the exception of specific administration costs, should be allocated on a uniform basis.

B. NON-COMMON FUNCTIONS

The study supporting the present costing-system, introduced in 1966, justified the province-wide pooling of non-common costs by function on the basis that each function is relatively standard in nature and quality throughout the province. The study group did not quarrel with this conclusion. However, in order for the pooling of these costs to be defensible, the functions must clearly be relatively standard in nature and quality. Moreover, as that study suggested, the allocation of these costs to customers must be by an appropriate measure-of-benefit distribution. The functions which were established in 1966, and are currently being used, do not in all respects meet these objectives.

For this reason, the group proposed redefining the non-common cost functions and revising the method of allocating them, to relate cost to benefit more effectively and at the same time ensure a sufficient pooling of costs to permit an administratively workable system. The group suggested these facilities might be classified by the four types of service provided, specifically metering of power requirements, the distribution of power beyond the grid, the transformation of power, and the provision of specific facilities. Return on equity, too, is not common to all customers and should be regarded as a non-common function. It is therefore recommended that

The non-common facilities should be reclassified under the functional groupings of Metering, Distribution, Transformation, Specific Facilities, and Return on Equity.

1. Metering Function

Metering is required for billing-purposes; and since this operation is mainly carried out below the 115-kilovolt level, it is a non-common function under the first recommendation. At present, the cost of metering is included in the cost of Stage-II transformation, unless this level of transformation is not supplied by Ontario Hydro. In this case, the cost of metering is included as a separate non-common function. The cost of this function is very low (7 cents a kilowatt for 1975). Since metering is essential to the operation of the system and all customers must be metered, it is recommended that

The full cost of metering should be identified as one function, and allocated on the basis of customers' loads.

2. Distribution Function

Once the first recommendation was carried through, segregating all facilities between common and non-common at the high side of stations transforming below 115 kilovolts, the current radial-transmission-line cost pool would be redefined to include only costs for those joint-use lines with voltages under 115 kilovolts. It is therefore recommended that

All lines emanating from transformation stations at voltages less than 115 kilovolts which are not defined as specific facilities should be considered as serving the distribution function.

The present method of allocating radial-transmission costs was introduced in 1966, as an integral part of the costing-system. The method uses the two chief factors which affect the cost of providing the facilities: the customers' loads and the distance from the grid. The method gives some recognition to the fact that certain customers, owing mainly to fortuitous circumstances, find themselves close to the grid facilities, while others, again because of reasons beyond their control, find themselves some distance from grid facilities as currently defined.

The location of the grid is beyond the customer's control, and may at times even be beyond Ontario Hydro's control. It is therefore recommended that

The costs of the distribution function should be allocated as a common cost to all customers.

The effect of this recommendation would be that while the distribution function would be non-common in that not all customers were served to the same extent, the cost of the function would be a common cost. This would eliminate any benefits or disadvantages of the customer's location relative to grid facilities.

Of the total capital in the radial-line cost pool, some 43 per cent is associated with 230-kilovolt and 115-kilovolt lines, which the group recommended reclassifying as serving the common function. Furthermore, under the proposed redefinition of the specific facility function, much of the remaining facilities would be classified as specific facilities. As a result of these reclassifications, the costs to be allocated to this function would be less than those presently allocated in the radial-line cost pool.

Transmission Losses

Losses of energy occur throughout the bulk-power and distribution system of Ontario Hydro. They vary according to the type and size of equipment used. The losses have averaged about 6.1 per cent of total generation in recent years, with 5.3 per cent in the bulk-power system (115 kilovolts and above) and 0.8 per cent in the distribution system (below 115 kilovolts). They occur in both the lines carrying the electricity and the transformation.

In the current cost-allocation system, most losses are allocated to all customers as a common cost according to their demand and energy. The remaining losses are specifically identified with the lines and stations located within municipalities or the power district and provided solely for them.

The following section on transformation recommends how to handle transformation losses. The remaining losses would be those associated with the bulk-power transmission system (115 kilovolts and above), plus losses from distribution lines not associated with specific customers. The losses would therefore be associated with facilities allocated to all customers on a common basis; and it would be appropriate to allocate these losses on a common basis to all customers. To do otherwise would mean holding customers responsible for their distance from the transmission system in the allocation of losses, yet not holding them responsible for the other costs associated with the lines. Since it is considered appropriate for customers to share prorata the cost of the bulk-power system plus the distribution lines not related to specific customers, it would be equally fair to allocate the losses associated with the facilities on the same basis. It is therefore recommended that

Losses from the grid and the non-specific facility distribution system should be allocated as a common cost to all customers.

3. Transformation Function

The current division of transformation costs between Stage I and Stage II recognizes the variation in transformation service provided to customers. However, the division of the stages at the 10-kilovolt level results in a rather large range of service (many voltages) for the same charge. Furthermore, current costing-methods do not always permit a complete assessment of alternatives. A case in point is determining the delivery voltage to a utility. Since the charge for receiving service at 44 kilovolts or 13.8 kilovolts is the same, the utility, when making decisions, does not have to weigh Ontario Hydro's cost of providing the lower voltage as opposed to the higher.

Costs for various levels of transformation were examined during the study. This examination entailed obtaining a weighted average transformation cost, based on transformer and distributing-stations built over the last 15 years. The capital costs of these stations were escalated to current value, in order to eliminate the variable of historical dollars; and a composite cost of transformation to each voltage level was then obtained by weighting the costs to a voltage level from each higher voltage level. This weighting was based on the capacities of all transformer and distributing-stations. Operating and maintenance costs were not included in the analysis, because the available costs suggested they did not vary significantly by type of station.

The transformation study revealed that Ontario Hydro would obtain a more appropriate pooling of costs using a dividing-point of 20 kilovolts between Stages I and II, rather than 10 kilovolts. It is therefore recommended that

The costs of transformation to below 115 kilovolts but above 20 kilovolts should comprise Stage I, and the costs of transformation to 20 kilovolts and below should comprise Stage II.

The effect of this recommendation would be to charge customers taking power between 10 kilovolts and 20 kilovolts for two stages of transformation, rather than one as at present. The effect of this change will be discussed further in a later section of this report.

To maintain transformation classifications that are cost-justified, the transformation costs should be examined on a regular basis.

Transformation Losses

One of the costs of transformation not recognized as a part of the transformation function is losses. If Ontario Hydro owns the station, the customers' loads are taken on the low side of the station, and all customers bear the cost of losses as part of the common-function charges.

The current study on transformation included calculating of the cost of losses for each level of transformation. To ensure that allocated costs reflect the total cost of service provided, it is recommended that

The cost of transformation losses associated with non-common facilities should be included in the charges for transformation.

This recommendation would require calculating losses each year, to transfer their cost from the common functions. Losses attributable to transformation to 115 kilovolts and above would continue as a common-function cost.

4. Specific-Facility Function

The current cost-allocation system has a non-common cost grouping for all costs providing specific facilities. These facilities are currently defined as all low-voltage Ontario Hydro lines within a municipality's boundaries which solely benefit the municipality. This definition does not include transformer or distributing-stations provided for the sole benefit of a single customer. The costs for these stations are presently included in the transformation functions. Also excluded from the definition are specific-facility lines provided to the Power District. Although this latter exclusion might appear to create inequities and cross-subsidizations of costs between classes, this in fact is not so because the costs of specific-facility lines in the Power District are currently part of their radial-line costs.

In order to avoid these apparent inequities and cross-subsidizations of cost, it is recommended that

Specific facilities should be defined so as to include all distribution and transformation facilities located within customers' boundaries for their sole benefit. For these purposes, the Power District is to be considered the geographical area not within the boundaries of any municipal utilities.

In evaluating the fairness of the current method of allocating costs for this function, and in measuring the appropriateness of the alternatives, the main premise was that either any distribution or transformation facility used specifically for a single customer and within its boundaries should be owned by the customer, or else the full costs of providing the facility should be recovered from the customer. It is assumed that providing this service is a fixed cost rather than one varying with the rate of facility use. For this reason the costs can be appropriately assigned on the basis of the capital investment.

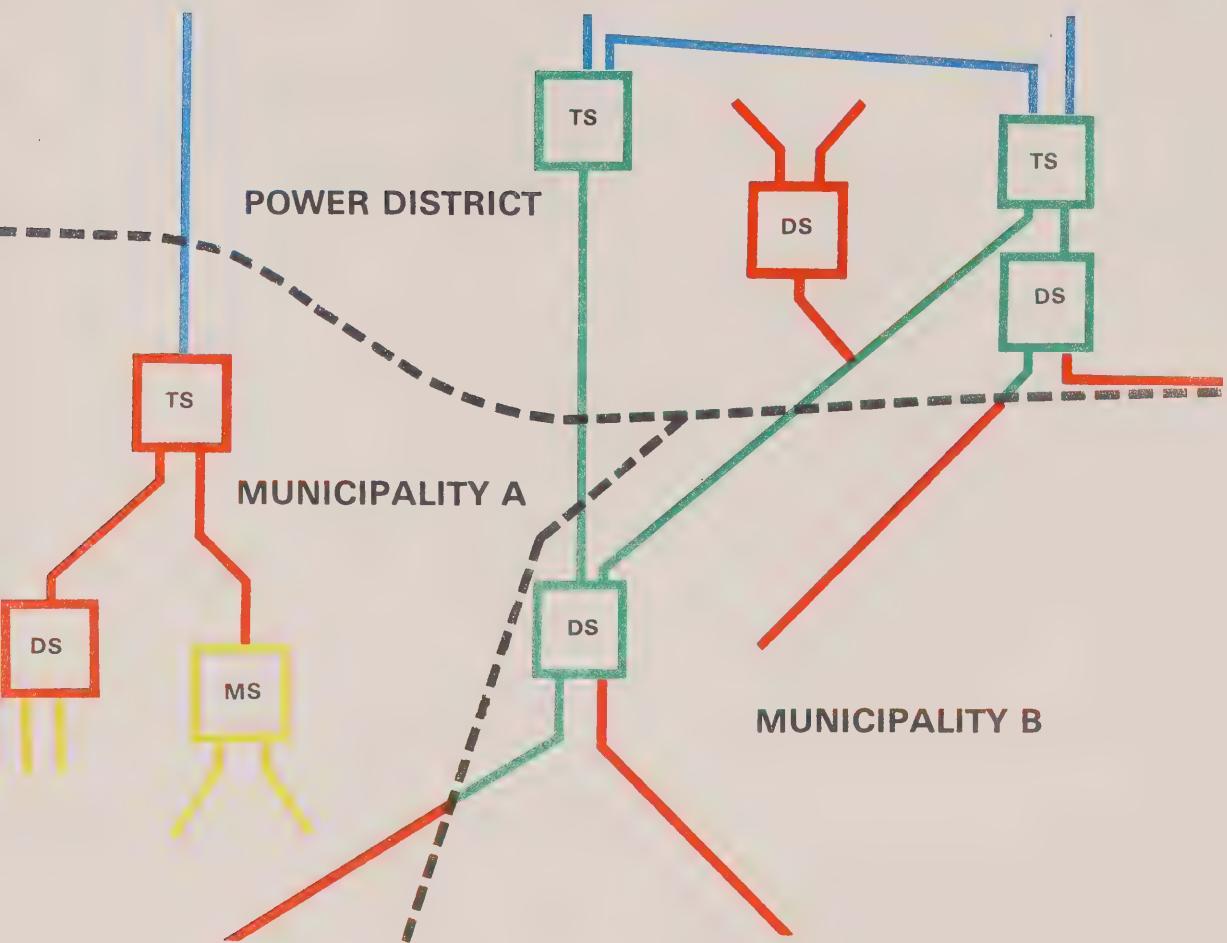
At present losses for specific-facility lines are calculated and adjustments are made to the customers' loads to account for the cost of these line losses. The study group agreed with this principle, and supported continuing adjustments for losses. Losses for stations classified as specific facilities should be handled similarly to those for specific-facility lines.

The facilities which the group proposed to treat as specific are illustrated in Figure 2.

Operating-advantages would accrue to both Ontario Hydro and the municipality if the municipality assumed ownership of the specific facilities. Large municipalities have been encouraged to purchase low-voltage transmission lines and substations, and to construct their own new low-voltage facilities. Since such facilities serve a distribution function, they should be the full responsibility of the municipality.

Many municipalities have recognized that low-voltage facilities within their operating-area serve a distributing-function, and have therefore assumed ownership of all those lines and substations. Other municipalities have recognized the validity of the concept, but have deferred ownership, following a financial analysis which suggests it is cheaper to pay for such facilities in the cost of power than to assume ownership. This comparison will be influenced, however, by the results of this study, so that the financial disadvantage to ownership may disappear or not be as great.

It would be desirable to require all municipalities to assume ownership of present distribution facilities, and to construct all new similar facilities. Constraints are being imposed on the amounts

ILLUSTRATION SHOWING FACILITIES TO BE
CLASSIFIED AS SPECIFIC

COMMON FACILITY
POOLED FACILITY
SPECIFIC FACILITY
MUNICIPAL OWNED
MUNICIPAL BOUNDARY

TS — TRANSFORMER STATION (to below 115 kv)

DS — DISTRIBUTION STATION

MS — MUNICIPAL STATION

of money available to Ontario Hydro for its capital construction program. Although the total cost of building specific facilities is eventually recovered through annual charges, the investment inflates the total capital requirements of Ontario Hydro and reduces the amount available for bulk-power system facilities which serve all customers.

Considering the benefits that accrue to both Ontario Hydro and the municipalities, and to establish a uniform division between the bulk-power and retail systems, it is recommended that

Municipalities should be strongly urged to assume ownership of present facilities operating below 115 kilovolts when those facilities are within the boundaries of the municipality and are used exclusively by the municipality.

Although it has not been actively encouraged, several municipal customers do own transformer stations stepping down from 115 kilovolts, and in one case from 230 kilovolts. Most of these are northern municipalities where 115 kilovolts was the only voltage available. The question of municipally owned transformer stations is at present the subject of discussion and negotiation, but it appears that local ownership is becoming more acceptable from Ontario Hydro's point of view. If a policy of local ownership is approved, the option of buying an asset for which specific facility charges are levied will be available for all specific facilities.

Where municipalities lack the resources to construct, operate, and maintain subtransmission lines and stations, ownership of the facilities could still be vested in them, with Ontario Hydro undertaking the construction, operation, and maintenance on a contract basis.

5. Return on Equity

Wholesale customers accumulate equity in Ontario Hydro through debt-retirement charges. Each customer's equity reflects its contributions to the equity financing of Ontario Hydro, and the amount depends upon the size and age of the customer. A return is applied on the customers' accumulated equity; and because it varies, the return can be considered a non-common function. The cost of providing return on equity is part of the common functions, since all customers are considered to share equally in its benefits; and it is allocated to all customers on the basis of their costing-loads.

Return on equity is being phased out over a period ending in 1978.

6. Retail-Distribution Function

The costs of providing facilities for distributing power at the retail level to customers Ontario Hydro serves directly with demands of less than 5,000 kilowatts are allocated to the retail-distribution function. The costs of this function and their allocation are the subject of a separate report which constitutes Supplement II to this volume.

V. DETERMINING NON-COMMON FACILITY COSTS

One of the chief requirements of the cost of power system for allocating is that it should allocate costs fairly between customer classes and among customers. This, in turn, requires a fair allocation of costs between the common and non-common facilities, to reflect the benefits the users receive.

It is therefore important, in reviewing the non-common facility costs, to ensure that the facilities attract the full costs they incur, thus leaving the common functions with their fair share of costs for allocation on a uniform basis. The recommendations for the allocation of non-common facility costs which the study group deemed necessary to accomplish this are outlined in the rest of this section.

A. DEPRECIATION

The cost of constructing and placing in service facilities which serve the non-common functions of transforming or transmitting bulk power at voltages below 115 kilovolts should be recoverable from the customers receiving the benefit.

These costs are recovered over the period of their expected useful life through depreciation charges. Generally a sinking-fund method of depreciation is presently used for all assets in service before 1 January 1971, except for thermal generating-stations, and a straight-line method for all other assets. The results of applying these two methods are combined to achieve an overall depreciation cost for each class of assets.

The group considered that using one method of depreciation applied by specific properties would yield a cost that could be more accurately allocated. It would also provide a readily determinable book value, and that might make it easier to sell non-common facilities to municipalities.

This view was expressed during the recent review of current depreciation methods by the Finance Branch. The report resulting from this review contains recommendations that will more fully meet power-costing requirements for depreciating non-common facilities. These recommendations have been approved by the Board of Directors, and will take effect on 1 January 1977. Until then, the current methods provide a reasonable estimate of how much recorded value facilities lose from wear, deterioration, or obsolescence.

B. CHARGES TO PROVIDE EQUITY

Equity in the Corporation results from including in rates charges for debt-retirement and provisions to the Reserve for Stabilization of Rates and Contingencies. These equity contributions give customers general equity in the assets of the bulk-power system. The charges are therefore considered common and shared by all customers at the same rate.

The study team held that equity charges should continue to be considered as applicable to the overall bulk-power system, and as such be assessed as a common cost. Apart from the theoretical basis for this treatment, it is well to avoid the complication of attempting to associate some share of equity financing with non-common facilities.

C. INTEREST

Besides depreciating non-common assets, it is necessary to recover the interest on funds used to finance those assets. In terms of the total financial operation of the Corporation, funds provided through equity charges reduce the borrowing-requirements, and so help to reduce total interest costs. As was said above, the study group did not consider equity charges applicable to non-common assets. To ensure that users of non-com-

mon facilities are not subsidized through their use of the general funds of the Corporation, an increase in their interest charges must be made to offset reduced interest costs from equity financing. An applicable interest rate to achieve this objective is Ontario Hydro's average long-term borrowing-rate. This rate reflects the financing-costs of the Corporation before any allowance is made for equity.

It is therefore recommended that

Interest costs of the non-common functions should be calculated on the net book value of the non-common assets at the average long-term borrowing-rate.

D. OPERATING AND MAINTENANCE COSTS

Generally, the current system of accounting distribution facilitates assigning operating and maintenance costs directly to specific functions, and sometimes to given properties. However, there are particular instances where operating and maintenance accounts must be allocated to functions by some arbitrary means, such as miles of line, or in the ratio of other costs. Experience shows that trying to do away with these arbitrary allocations and charge all costs directly to properties by account distribution would probably not warrant the cost of the additional record-keeping. It is therefore considered that the present methods of determining and allocating operating and maintenance costs should be continued.

An overview of the allocating-method used for direct operating and maintenance costs is shown in Figure 3.

E. OVERHEAD COSTS

Current practice assigns indirect operating and maintenance costs to property classes on the basis of direct operating and maintenance costs. These indirect costs do not include any share of the general administration costs. In ascertaining the actual cost of providing non-common facilities, it is appropriate to assign all costs incurred on non-common facilities to the applicable functions. It is therefore recommended that

The non-common facility costs should include a share of the general administration costs.

The general administration costs applicable to the non-common facilities should be in direct proportion to the operating and maintenance costs.

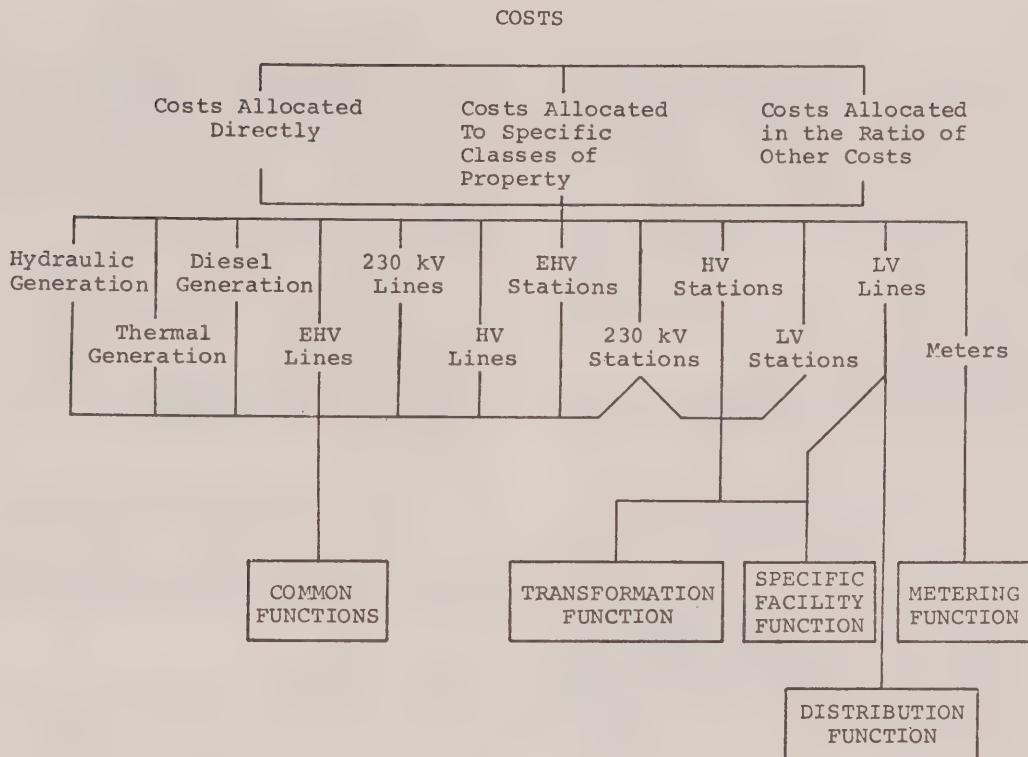
F. PROPERTY OF NON-COMMON FACILITY COSTS

The foregoing analysis of the non-common facility costs suggests that most costs are presently being allocated fairly. It is therefore recommended that

Except for interest and overhead costs, all non-common facility costs should be determined as at present.

Figure 3

Allocation of Direct Operating and Maintenance Costs



VI. EFFECT OF RECOMMENDATIONS

In order to determine the effect of the foregoing recommendations, the actual cost-of-power data for 1975 were used. As explained in Section IV of this supplement, under Meters and Distribution, although non-common functions, would be common costs allocated on the basis of costing-load. Accordingly, for the purpose of determining effects, the costs for these functions have been included as an integral part of common costs in all the data shown.

The recommendations result in a shift of \$32,509,000 from common to non-common costs, as shown in the accompanying table.

Recommendation	Description	\$'000's
1	Reclassification of capital for 230 kV transformation stations	11,235
4	Reclassification of metering costs	(788)

9	Transformation losses	3,080
10	Increased specific facility capital for lines	3,985
12	Increased non-common interest cost	7,934
13	Non-common Administration charge	7,063
TOTAL		<u>32,509</u>

Table 1 of Appendix I provides further detail.

This transfer of costs, combined with the reallocation of radial-line costs on a costing-load basis and the change in the division between transformation stages I and II from 10 kilovolts to 20 kilovolts, produces changes in total customer-class costs as shown in the accompanying table.

	\$000's
	Increase (Decrease)
Municipalities	(1,823)
Retail	4,611
Direct Industrial	<u>(2,788)</u>
Total Change	—

Table 2 of Appendix I provides further detail.

A. MUNICIPALITIES

The effect of the recommendations on the individual municipalities is summarized in the accompanying table.

Effect on Municipalities

\$ / kW	Number of Municipalities	
	Increase	Decrease
0 to 1.00	13	146
1.01 to 2.00	8	17
2.01 to 3.00	8	10
3.01 to 4.00	115	2
more than 4.00	34	—
	<u>178</u>	<u>175</u>

Most of the decreases of one dollar or less are for municipalities receiving all power below 115 kilovolts but above 20 kilovolts. Municipalities taking all power below 10 kilovolts account for most of the 115 increases of between \$3.01 and \$4.00. The municipalities affected most seriously are those taking power between 10 and 20 kilovolts. The cost increase for them is about \$7.35 a kilowatt, if 100 per cent of load is received in this range.

As can be discerned from the foregoing figures, the average effect will be greater on the smaller municipalities. This is because they tend to take power at lower voltage levels. The effect on the class as a whole, however, is to reduce the total cost; and the study group held that the increases to individual municipalities should be phased in over several years, sharing the necessary adjustments within the class.

Increases have also resulted from specific-facility transformer and distributing-stations. In some cases, the station's capital cost is excessive because of equipment installed for Ontario Hydro's purposes (such as voltage regulators) rather than to serve the municipality. In such instances, the capital cost should be adjusted to reflect the cost of the facility provided solely to serve the municipality.

Another important factor influencing the cost per kilowatt is the effect of newly built stations or recent modifications to increase

the capacity of an existing station. Inflation has caused these stations to cost more per kilowatt of installed capacity. Moreover, a recently constructed station will invariably not be fully loaded, because the size of a station depends not only on current loads but also on expected future loads. The combination of high capital costs and low loading, when costed on a specific-facility basis, results in a high dollar cost per kilowatt of cost-loading.

To reduce the effect of the changes on individual municipalities, it is recommended that

The costs for a specific-facility station should be no more than 25 per cent higher than the standard charge for the appropriate level of transformation.

The problem will disappear as loads grow on the newer specific-facility stations, if no more such stations are built.

B. RETAIL

The cost allocated to retail customers showed an increase mainly because they take power at low voltage levels and because of the allocation of specific-facility lines and stations. Putting this latter allocation on a more specific basis increases costs, since more stations, and longer distribution lines than those of municipalities, are required to service the rural customers.

C. DIRECT INDUSTRIAL

This class of customers would gain through the recommended changes, since their costs would fall by \$2.8 million. The transfer of common costs to non-common would benefit them because they do not use non-common facilities as much as the other classes.

In determining the effect on direct industrial customers, it has been assumed that the rates for each function would be adjusted by the amount of cost changes to that function. In 1975 this approach would have yielded reductions of \$2.88 per kilowatt for customers taking power at 115 kilovolts and above, and \$.96 per kilowatt for those taking power below 115 kilovolts but above 20 kilovolts. There are not many direct industrial customers taking power below 20 kilovolts; but for those that do, the study team considered that the change should be phased in through rates within the class.

SUPPLEMENT II: Report on Costs in the Retail-Distribution System

I. INTRODUCTION

Ontario Hydro owns and operates generation and transmission facilities throughout the province to provide electric power to the people of Ontario. For costing-purposes these facilities are considered to be operated on behalf of all users of electric energy, and the output of energy at this stage is designated as the bulk-power system.

Electric service to residential and commercial customers is provided through a network of distribution facilities owned and operated either by municipal utilities or by Ontario Hydro. The distribution of energy through Ontario Hydro facilities to direct retail customers (farm, residential with intermittent occupancy, year-round residential, and general) is designated as 'the retail distribution system' or simply 'the retail system'.

To perform the daily operations of both the bulk-power system and the retail system, Ontario Hydro has staff located at district offices and service centres in all parts of the province. They are known as area offices, and are supported by technical and administrative staff in seven regional offices located in important cities or towns. The overall administration and operation of Ontario Hydro is co-ordinated centrally at the head office in Toronto.

The objectives of this study have been to identify the costs properly attributable to the retail system and to develop procedures to ensure an appropriate allocation of these costs to the retail system.

These costs are identified as operation, maintenance, and administration; interest; depreciation; appropriations of net income for debt retirement; and provision for the stabilization of rates and contingencies.

A. SUMMARY

In collaboration with personnel in the regions and head office the costs of the retail system were established as the cost of all activities carried out on behalf of the retail system and a proportionate share of the remaining administrative activities where these include a responsibility for retail-system activity. This definition is essentially a documentation of current costing-principles applicable to the retail system.

In developing cost-allocation procedures the study team have identified those activities and costs which are incurred specifically for purposes of operating and maintaining the retail system. For certain other activities there is a specific portion of costs incurred for the benefit of retail customers. Allocation procedures were developed which identify the share to be directed to the retail system. In addition there exists a series of administrative activities where the specific relationship with the retail system is too remote to be measured precisely, but nonetheless clearly exists. For those activities an indicator has been chosen which will measure the retail system's share of these administrative costs.

In maintaining the present costing-principles the proposals do not cause any great shift in total costs allocated to the retail system. The recommended procedures will, however, permit the costing-system to respond to technical and organizational changes as they occur. A brief outline of the study's recommendations follows:

Overheads should continue to be identified in accordance with the current procedures for all allocations, subject to a review in total of corporate overhead policies and procedures.

With respect to activities carried out in the areas and regions it is recommended that all work done exclusively for the retail system, such as retail-line clearing and maintenance, customer service, and repair of storm damage to the retail system, should continue to be charged directly to the retail system. The study group also recommended specifically identifying customer-service activities performed by area administrative personnel, and allocating all other area administrative costs between the bulk-power and retail systems on the basis of direct costs in the areas. Regional supply costs should continue to be allocated between the two systems on the basis of the value of materials issued from stores, with slight accounting-refinements to match the costs being allocated with the associated activities. For regional administrative costs the group recommended specifically allocating departmental costs to customer groupings where such specific association could be readily identified, and allocating the remaining regional administrative costs between the bulk-power and retail systems on the basis of total direct costs in the region.

Similarly, the study group recommended allocating head-office administrative costs that could be specifically identified with the retail system directly to the retail system. For other head-office administrative activities which are deemed to support both the bulk-power and retail-distribution systems, a two-step allocation process is recommended. First, a share of the costs of such activities should be allocated to each region on the basis of an appropriate measuring-device for each activity. Secondly, all costs so allocated to the regions should be allocated between the bulk-power and retail systems on the same basis as similar costs originating in the regions. The group also recommended allocating certain other head-office costs, either not associated with the retail system or associated with the other customer groupings, to the bulk-power system.

With the minor exception of certain technical refinements to the basis for allocating interest expense, the study group recommended making no change in the allocation of interest and depreciation between the two systems. On the other hand, it recommended allocating the appropriations from income between the two systems in total on the basis of net capital expenditures. This allocation, however, should be subject to a minimum allocation to each system of the amount required for debt-retirement purposes.

Details of the effects of the recommendations are included in Section VI of this Supplement, Observations and Conclusions.

B. APPROACH TO THE STUDY

The procedures for allocating costs to the retail system have developed over time as an integral part of the procedures for allocating bulk-power costs.

Costs either charged directly or allocated to the retail system were tested to assess how far the procedures reflected the current working of the retail system, and to determine whether the costs were in fact being incurred primarily on behalf of the retail system. Tests were carried out on the retail share of bulk-power costs to ensure that no apparent misallocations were occurring at this stage. Other studies within the electricity costing and pricing-studies will attempt to ensure an appropriate allocation of bulk-power costs to all classes of customers, including those of the retail system.

Management reporting-aids and techniques, such as work programs, work measurement, and computer systems, have been

greatly developed in recent years. The object in preparing this report was to take advantage of these features where feasible to define the costs of the retail system more specifically. Where such techniques are adopted and costs are more specifically defined, a more accurate reflection of activities can be achieved, and a more natural response to changing circumstances can be expected.

In carrying out the study, each of three main classifications of accounts was approached separately, and the report was similarly structured. The classifications are

1. Regional and Area Costs,
2. Head-Office Costs, and
3. Committed Costs and Appropriations of Net Income.

A further section on overhead policy and procedure is included because of concerns which became apparent in that area.

C. CONSTRAINTS

The study was limited to a review of the costs of the retail system as presently structured. It did not probe deeply into the possible effect of future regional governments, except to ensure that the retail system will continue to be appropriately costed during the next five-year period.

As was mentioned previously, Ontario Hydro is structured in such a manner that although certain direct activities of the retail system can be specifically identified for purposes of costing, many others, particularly administrative overheads, are shared by all functions, and their allocation is subject to a degree of judgement.

One such judgemental allocation is that made to relieve operating-costs of capital and recoverable overheads before these costs are shared between the bulk-power and retail systems. Sufficient concern was expressed by regional management and within the study group about the effect of the overhead process for the group to feel its implications had to be identified in the report. The findings neither verified nor disproved that the total amount apportioned to capital through this process was appropriate. The calculations meet the mathematical requirements of the system, but appear to cause significant misallocations, particularly to the retail system, as a result of the allocation processes. Therefore, throughout the balance of this report, concurrence with the current overhead policy and procedures is limited to the total apportionment.

Section V of this Supplement, Overhead Policy and Procedures, contains an outline of the current overhead policy and procedures, along with more specific details about the study team's concerns.

II. REGIONAL AND AREA COSTS

The study team reviewed the activities of the retail system carried out in the regions and sorted them into the following cost groupings:

1. Direct operating and maintenance costs
2. Area administrative costs
3. Regional supply costs
4. Regional administrative costs

The team's findings and recommendations for each of these cost groupings follow.

A. DIRECT OPERATING AND MAINTENANCE COSTS

Activities charged directly to the retail system consist of retail-line clearing, customer service, maintenance, customer applications, and repair of storm damage. At present the accounting-system collects by functional account the costs of direct activities applicable to the retail system.

The study team reviewed the type of work being performed and reported under each of the foregoing cost groupings with regional management personnel. It found the activities could all be identified with the retail system, and were all properly recognized by the cost-allocation system.

A similar review of the direct operating and maintenance activities of the bulk-power system showed that they were also properly recognized by the costing-system.

Therefore it is recommended that

Retail-line clearing, customer service, maintenance, customer applications, and repair of storm damage should continue to be charged directly to the retail system.

B. AREA ADMINISTRATIVE COSTS

Area administrative costs consist of the salaries of area managers, area supervisors, and area clerical staff, and all other costs associated with the general running of the area office. Area administrative costs are collected in one functional account and allocated over the various work activities that the areas carry out.

The following outlines the present allocation sequence:

1. 30 per cent of gross area administrative costs is allocated to the retail system as customer service. (i.e., cash, billing, and clerical assistance to sales and service).
2. After the allocation to customer service, a share of the remaining area administrative costs is allocated to capital in accordance with the overhead policy.
3. The rest of area administrative cost is allocated between the retail and bulk-power systems on the basis of direct labour costs for all areas combined.

A review of the activities on the 1974 area administrative work programs showed that just under 30 per cent of the activities were directed to customer service. The results verified that the present allocation of 30 per cent of area administrative costs on a corporation-wide basis to retail customer service fairly reflected current activity. The opinions of region and area management personnel supported these findings. To ensure that the allocation system was sufficiently flexible to respond to changing conditions, it would be more appropriate to gather the cost of customer service activities by individual area than to apply the single percentage.

Area clerical work standards are used to measure work activity for preparing annual work programs and determining area clerical staff levels. The team therefore proposed also using the standards to define the customer service activity carried out by area administrative personnel. Both region management and the Management Services Department concur that this proposal is reasonable.

It is appropriate to apply the overhead allocation after deducting customer service. This exemption of customer service agrees with the treatment of other direct activities applicable to the retail system.

The final allocation between the bulk-power system and the retail system on the basis of direct labour costs does not allow for policy changes such as a possible increase in contract work. The final allocation can more appropriately be related to total direct costs rather than labour alone. An analysis of 1974 costs using the total cost application did not reveal any significant changes in the allocation results. This would change, though, if outside forces were to be employed more on either the bulk-power system or the retail system. Therefore, the total dollar costs reflect more realistically the cost of activities under management control.

The team also proposed allocating by region in order to introduce a truer reflection of the differing operating-situations. As an auxiliary benefit, this process would make it possible to produce more meaningful management reports on the working of the retail system.

Therefore it is recommended that

1. *Customer service activities as defined should be collected by area and allocated directly to the retail system.*
2. *After the allocation of customer service, a share of area administrative costs should continue to be allocated to capital based on the overhead policy.*
3. *The remainder of area administrative costs should be allocated between the retail and bulk-power systems on the basis of total direct costs in the areas by region.*

C. REGIONAL SUPPLY COSTS

Supply costs include the cost of maintaining and controlling region stores inventories for retail, bulk-power, and capital-construction purposes. It covers the salaries of stockkeeping personnel, various freight and shipping-costs, miscellaneous inventory charges, and associated costs of space.

The current allocation is carried out in the following sequence:

1. A share of regional supply cost is allocated to capital in accordance with the overhead policy.
2. The remaining costs are allocated between the bulk-power and retail systems on the basis of the value of each region's issues from stores, as recorded in the materials system.

Within the context of the present capital overhead policy and procedures, the current overhead allocation is the most appropriate. However, Section V of this Supplement, Overhead Policy and Procedures, shows how this particular allocation demonstrates the team's concerns with the corporate overhead policy and procedures.

The base used to allocate costs between the bulk-power and retail systems does not allow for the handling and control of materials not on the materials system. The study team therefore considered using the total material charges in the region, which would add the value of direct purchases made through the region, and the value of issues from stores not on the materials system, to the current base. This would shift the ratio significantly towards the bulk-power system, since most additional material in the base would be primarily for the use of hydraulic and station maintenance crews. Review of the supply costs associated with ordering and storing hydraulic and station maintenance material showed that they were often included in crew costs and not charged to supply costs.

The team therefore concluded that, where supply and storage centres exist mainly for hydraulic and station maintenance, they should be accounted for separately from area stores supply costs. This proposal also leads to a direct charge to the bulk-power system for supply costs of specific bulk-power system activity.

It is therefore recommended that

1. *Stores activity wholly associated with operating the bulk-power system should be separated in the accounting-system.*
2. *The allocation of regional supply costs should continue to be as follows:*
 - a. *A share of regional supply costs should be allocated to capital in accordance with the overhead policy.*
 - b. *The rest should be allocated between the bulk-power and retail systems on the basis of the value of each region's issues from stores as recorded in materials system.*

D. REGIONAL ADMINISTRATIVE COSTS

Regional administrative costs include the salaries and other costs associated with the various regional functions, with other miscellaneous regional outlays such as cost of space and computing-system charges. The data are accumulated by region. The current allocation process ignores this individual regional identification, and summarizes all regions by function for allocation in the following manner:

1. A share of each administrative function in the regions is allocated to capital in accordance with the overhead policy.
2. The rest of each administrative function is either allocated directly to the bulk-power system or classified as an administrative-office expense for further allocation between the bulk-power and retail systems.
3. Administrative-office expense is allocated between the bulk-power and retail systems based on direct labour costs in the regions and thermal stations. (Regional administrative-office expenses are combined with similar head-office costs for one allocation process. A listing of all administrative-office expenses is included in Appendix I to this Supplement.)

These allocation procedures are insensitive to the individual regional identification and the close association that exists between regional administration and the retail system. Instead, the process integrates costs of regional groups with those of head-office functions which in practice have only remote association with the retail system. This broad approach to allocating regional administrative costs creates a process that cannot re-

spond properly to changing circumstances, as was shown in the continued use of thermal labour costs after the transfer of fossil-fired generating stations from regions to head-office control.

An allocation related directly to the responsibility of the regions would be readily justifiable and more flexible to meet changing circumstances. The team proposed a specific process allocating regional administrative costs, separate from head-office groups, based on regional activity.

For certain functions in the regions a specific percentage of costs can be identified for allocation to the retail system. Again, for functions where activity can be identified as specifically on behalf of municipal or direct industrial customers, the appropriate percentage of costs can be identified for allocation to each. This separation avoids the current discrepancy for certain functions, where the retail customers absorb their own identifiable costs and a share of the specific costs of other customers. Allocations made objectively by region management for cost-of-power purposes and based on work programs would result in a reasonable allocation of the costs of these functions to the various groups of customers. The allocations would be by individual region, and subject to annual review to reflect changing conditions.

The team proposed allocating the rest of regional administrative costs by region between the bulk-power system and the retail system, on the basis of total direct costs in the region. The consistent use of total direct costs reflects the general activity for which management is responsible under changing circumstances.

Working with the regions, tests of their identifiable activities were conducted using 1974 data. Overall the tests resulted in a shift of regional administrative costs to the retail system.

Therefore it is recommended that

1. *A share of each administrative function in the regions should continue to be allocated to capital in accordance with the overhead policy.*
2. *Regional administrative functions as designated by each region should be allocated on a specific percentage basis to each group of customers and the bulk-power system.*
3. *The rest of regional administrative costs should be allocated between the bulk-power and retail systems by region based on total direct costs.*

III. HEAD-OFFICE COSTS

The study team reviewed costs incurred at the head office as they related to the retail system, and found they could be sorted into the following cost groupings:

1. Costs of head-office activities incurred directly on behalf of the retail system.
2. Costs of head-office activities in support of both the bulk-power and retail systems.
3. Costs of head-office activities not associated with the retail system.

The findings and recommendations for each of these cost groupings follow.

A. COSTS INCURRED DIRECTLY ON BEHALF OF THE RETAIL SYSTEM

The current allocation process includes three categories of cost incurred directly on behalf of the retail system. These are

1. *Public Liability and Property-Damage Insurance.* All costs remaining after charging participating municipal utilities 2.5 cents per \$100 of revenue.
2. *Customer Billing-Costs.* A charge of 50 cents per retail bill issued is made to the retail system to cover billing and mailing-costs incurred at head office.
3. *Supply Division - Meter Services.* All costs associated with reverification of retail-billing meters.

The review confirmed that each of the foregoing items has a cost content directly attributable to the retail system, but that some costs can be identified more precisely.

The current process does not direct any of the cost of public liability and property damage insurance to the bulk-power system, although the premium covers accidents which might occur in connection with activity on the bulk-power system. The Insurance Department states that the rate established to obtain a share of the premium from each of the participating municipalities (2.5 cents per \$100 of revenue) is tested regularly and subject to approval by the Ontario Hydro Board. The rate has proved fair over the years as far as the utilities are concerned, and the Insurance Department concurs with the suggestion that it would be a reasonable extension of a principle to use the same rate process to determine the share of the retail system. The rest of the premium would be allocated to the bulk-power system.

The customer billing-costs were previously considered to consist primarily of the computerized customer system and the customer mailing-costs associated with retail bills. Historically the amount of these costs has not been readily identifiable, but previous studies suggested that a rate of fifty cents per bill issued was a reasonable estimate of customer billing-costs. The Computer Planning Department now annually identifies the costs of running the retail customer system. Similarly, the Central Mailing Section identifies postage, labour, and envelope costs associated with customer billing-activity. To be consistent with the aim of recording specific costs where they can be identified, the team proposed specifically identifying the customer and mailing-costs of the retail system and charging them directly to the system.

The Meter Services Department provides a meter-verification service for new and existing meters for all groups of customers within Ontario Hydro. The costs of all verification carried out for groups outside the retail system are charged out at departmental rates to the authority requesting the service. The balance of

costs remaining in the Meter Services Department are incurred on behalf of the retail meter-reverification program. The team proposed continuing to charge this remaining balance of Meter Service Department costs to the retail system.

In addition to the foregoing, in discussions with head-office management one further group, not currently charged to the retail system, was identified as able to measure specific association with the retail system. The System Maintenance Division, particularly the Lines and Forestry Departments, provide staff assistance to the regions in support of the retail system.

Through the use of annual work programs this division identifies by department the degree of retail system activity. The team proposed using this data to allocate a designated share of System Maintenance Division costs directly to the retail system.

Therefore it is recommended that

For each head-office function where specific services are provided for the retail system, the cost of the service should be identified and charged to the retail system.

Currently the costs to be specifically charged consist of:

- a. Public liability and property-damage insurance,*
- b. Customer billing-costs,*
- c. Meter Services Department, and*
- d. System Maintenance Division costs associated with the retail system.*

B. COSTS IN SUPPORT OF BOTH THE BULK-POWER AND RETAIL SYSTEMS

The category of administrative-office expense includes the costs of all head-office and regional administrative groups deemed to have an association with the retail system. The recommendations in Section II of this Supplement under Regional Administrative Costs, were addressed to the regional administrative portions of this cost classification. The following is the current allocation process for the classification of administrative-office expense.

1. A share of the head-office administrative function is allocated to capital in accordance with the overhead policy.
2. The rest of each head-office administrative function is either allocated directly to the bulk-power system or classified as an administrative-office expense for further allocation between bulk-power and retail systems.
3. Administrative-office expense is allocated between the bulk-power and retail systems based on direct labour costs in the regions and thermal stations.

The criterion for including a function in the administrative-office expense classification is whether that function supplies a service to the retail system. The incremental nature of that service, or the possibility that a similar service is provided to other customer classes, is sometimes ignored. Moreover, the allocation process implies that where a degree of association with the retail system exists, that degree of association is constant among all functions.

The team found it hard to determine how closely many head-office administrative functions were associated with the retail system. However, many of the groups could identify a relationship with the regions, and the team managed to develop a relevant measuring-device for each group's involvement with all regional activity.

The team also found that at present no head-office supply costs were being directed to the retail system, although in discussion with Supply Division personnel it became evident that parts of the supply function were very much associated with regional activity.

The team therefore proposed replacing the allocation for administrative-office expense with a process that would more specifically measure the relation of individual groups with regional, and hence retail, activity. For head-office administrative and supply functions that could be identified with a service provided on behalf of the regions, they proposed classifying the costs as distribution-system administrative costs, and dividing the functions into two main cost groupings, as follows:

1. Administrative Costs

- a.general
- b.personnel
- c.financial

2. Supply Costs

- a.general
- b.freight on poles

1. Administrative Costs

a. *General.* General head-office administrative groups provide functional guidance as a regular part of their responsibilities to all facets of the organization. Those organizational groups which can currently be classified in this manner include:

1. Corporate Services, except for Communication Services, Building and Office Facilities, and mailing-costs allocated directly to the retail system.

2. Secretarial Branch

3. Power-Market Analysis

4. Customer Service Division, except for the departments specifically assigned to customer classes.

5. Computer Branch, net after charging for services and allocation of customer system costs direct to the retail system.

b. *Personnel.* Personnel head-office administrative functions include all activities of the Personnel Branch.

c. *Financial.* The following head-office administrative functions should be included as part of the financial classification:

1. Comptroller's Division

2. Financial Information Systems Division

3. Treasury Division, except for public liability and property damage insurance, which would be allocated separately.

Because of the broad nature of these groups, their relationship can best be measured by the day-to-day activity displayed in total operating, maintenance, and administrative costs. Consequently it is proposed to direct a share of each of the administrative functions to the regions, using as a base the ratio of controllable costs in each region to total controllable costs.

(Controllable costs are operating, maintenance, and administrative costs.) For both General and Personnel costs it is proposed to direct the full amount indicated by the ratio to each region, whereas for financial costs, it is proposed to direct fifty per cent of the amount determined by the ratio to each region.

The full amount of the ratio which it is proposed to direct to the regions for general activities reflects the amount of service they provide in their daily operations. The Personnel Branch provides services for the benefit, development, and employment of all staff. An analysis of staff statistics reveals that the ratio of employees in each region to the total number of employees, excluding field forces devoted entirely to capital construction activity, is similar to the ratio for controllable costs. Therefore use of the full ratio for Personnel Branch activity is appropriate. However, certain segments of the financial administrative groups do not have regular liaison with the regions. Much of their activity is more related to developing and applying corporate planning and policy. On this basis the study team concluded that only fifty per cent of the amount determined by the ratio for the financial administration function costs should be directed to the regions.

The administrative costs accumulated through the foregoing processes represent the cost of activities in support of the general administrative activities in the regions. Therefore, these costs should be allocated between the bulk-power and retail systems on the same basis as general regional administrative costs. (that is to say, based on total direct costs in the bulk-power and retail systems in each region.)

2. Supply Costs

a. *General.* General supply activities found to be associated with regions include the costs of procurement, control, and storage of general materials. The supply functions which carry out these responsibilities are

1. Supply Control Department,
2. Standards and Metric Conversion Department (except Metric Conversion),
3. General Products Procurement Department - General Products and Inspection, and

4. Service-Centre Facilities Department - Warehousing.

For these general supply costs, the team proposed allocating a share to each region, based on the value of the ratio of materials transferred to the regions to the total value of material handled. The Supply Division regularly records the value of material shipped to the regions from Central Stores, and could provide this data for purposes of allocation.

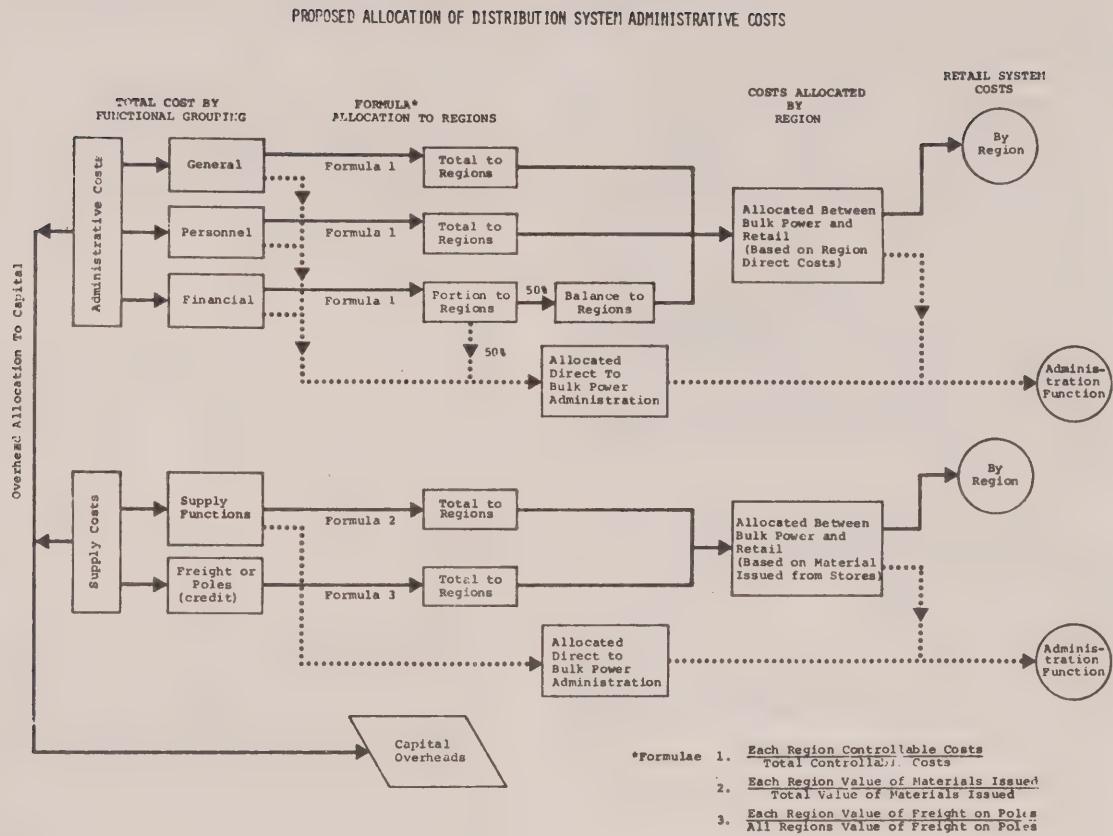
b. *Freight on poles.* Besides the foregoing general supply activities associated with the regions, there is a credit recorded within the accounting-system to offset the freight charge added to the cost of poles at the time of issue.

The team proposed continuing to allocate the credit for freight on poles to each region on the basis of charges for freight and shipment of poles included in each region's supply costs.

The combined costs and credits accumulated in the foregoing processes represent the costs incurred at head office on materials transferred to the regions. Therefore, these costs should be allocated between the bulk-power and retail system on the same basis as supply costs incurred in the regions (i.e., based on the value of materials issued to the bulk-power and retail systems as recorded in the materials system).

Figure 4 shows the allocation processes recommended for head-office costs in support of both the bulk-power and retail systems. In summary, for all head-office administrative functions representing a service to the regions, it is recommended that

Figure 4



1. A share of each head-office administrative function should continue to be allocated to capital in accordance with the overhead policy.
2. The rest of each head-office administrative function should be either allocated directly to the bulk-power system or identified as a service performed partly for the benefit of the regions.
3. Where a service is performed partly for the benefit of the regions,
 - The cost of that service should be measured to determine the portion attributable to each region. (Specific methods of measurement are set out in the report.)
 - Each region's share should be allocated between the bulk-power and retail systems in the same way as related regional costs.

C. COSTS NOT ASSOCIATED WITH THE RETAIL SYSTEM

Historically, several head-office administrative activities have not

been considered to have any relationship with the retail system. All costs of these functions have been directed to the bulk-power system.

At the end of this section is a list of activities for which the study team agreed with the current practice of not allocating any portion to the retail system. Throughout the report the team identified activities not now allocated to the retail system, for which they proposed allocating a share to the retail system.

They also found that certain functions previously allocated to the retail system as part of the classification of administrative-office expense were no longer related to the retail system. The following paragraphs outline their reasons for removing each activity from the allocation process in the retail system.

All costs associated with the Board of Directors, the Corporate Office, and General Management are now included in the classification of administrative-office expense. The review showed that any specific involvement of these groups with retail-system matters would be slight, and would likely be offset by similar specific concern for matters related to the direct industrial and municipal customers.

Another classification of administrative-office expense where a similar analysis can be applied is the costs of the Law Division. The Law Division does perform certain activities on behalf of the retail system, such as help in collecting accounts and handling claims for damages to rural plant from accidents. On the other hand, the Law Division is involved in drawing up power contracts for other groups of customers (these are not required by the retail system), and is available to provide informal consultation with legal personnel representing municipal utilities. Since this division performs activities specifically on behalf of each customer class, it seems inappropriate to allocate a specific amount to the retail system. Consequently the team concluded that the most appropriate allocation of Law-Division costs would be achieved through allocation to the bulk-power system.

In discussions with the Public Relations Division, it was ascertained that any specific Public Relations activities on behalf of the retail system would be carried out by the regional Public Relations Officer. The Public Relations Division's activity is more directly concerned with overall corporate matters than with any one class of customers.

In conclusion, the study team concurred with the current policy of not allocating any costs of the following organizational groups to the retail system:

- 1.Engineering Branch
- 2.Research Division
- 3.System Planning Division
- 4.Nuclear Generation Division
- 5.Thermal Generation Division
- 6.Power Systems Division
- 7.Supply Division (except as specifically proposed)
- 8.Building and Office Facilities Department
- 9.Property Division
- 10.Office of the Chief Economist
- 11.Fuels Division
- 12.AMEU
- 13.Rate and System Expansion Hearings Department

Therefore it is recommended that

For each head-office administrative function where activity does not benefit the retail system, or where like activity similarly benefits other customer groups, all costs, after allocations have been made to capital, should be allocated to the bulk-power system.

IV. COMMITTED COSTS AND APPROPRIATIONS OF NET INCOME

Committed costs include interest and depreciation. They are charged to the retail system in order to ensure that retail customers share in the cost of debt and the cost of retail assets over their useful life. Appropriations of net income are made to maintain the financial soundness of the Corporation by providing funds for both the retirement of debt and the future growth of the systems.

A. INTEREST EXPENSE

Net corporate interest expense is allocated between the bulk-power and retail systems on the basis of average net assets less equity invested in the system. The result is deemed to be the net debt on behalf of each system. The basis for allocating interest expense is illustrated more specifically in the accompanying table:

	<u>Bulk Power System</u>	<u>Retail System</u>
Average Capital	+ xxx	+ xxx
Average Accumulated Dep.	- xxx	- xxx
Average Accounts Rec.	+ xxx	+ xxx
Unallocated Deprec.	- xxx	- xxx
Write Up	+ xxx	+ xxx
Fuel Inventories	+ xxx	Ø
Stores Inventories	+ xxx	+ xxx
Contributed Capital	- Ø	- xxx
Accumulated Equity	- xxx	- xxx

The study team agreed with allocating interest expense between the two systems on the basis of the value of assets supported by the outstanding debt. It also agreed with the elements included in the base established to perform this allocation; but it held that three of these elements - average accounts receivable, fuels inventories, and stores inventories - should be apportioned in a way that more accurately reflected the content.

Retail accounts receivable, which include accruals for unbilled energy, are entirely directed to the retail system in the allocation base. Receivables from municipalities and direct customers are included in the bulk-power-system allocation base for sharing among all customers. The effect on the retail system of this allocation is that interest applicable to all receivables of the retail system is charged to the retail system, while the interest applicable to receivables of municipal and direct industrial customers is shared by the retail system in bulk power costs.

This discrepancy can be corrected either by allocating the interest on receivables of municipal and direct industrial customers to their specific customer classes, as is done for the retail system, or by directing a share of the retail accounts receivable through the bulk-power system for allocation to all customer classes. The former proposal was rejected, on the ground that it would require significant new costing-procedures. Therefore, it is proposed to transfer an amount equal to an average month's bulk-power costs of the retail system from the average accounts receivable of the retail system to the receivables of the bulk-power system. This period of one month is consistent with the period of receivables for the municipal and direct customers in the bulk-power system. The amount chosen is the actual recorded bulk-power costs on behalf of the retail system.

Fuel and stores inventory values used in the allocation base are those at year's end. To agree with the main elements in the base and to assess more accurately the effect of fuel and stores inventories on interest costs, the use of average inventories is more appropriate.

Stores inventories in the base are allocated between the retail and bulk-power systems using the criterion of the value of stores issues from the materials system. This base ignores large amounts of stores maintained to service system-maintenance crews and thermal and nuclear generating-stations. The study team believed Ontario Hydro could arrive at a more appropriate allocation through regular review and estimate, preferably annually of the apportionment of stores inventory between the bulk-power and retail systems.

Therefore it is recommended that

Interest expense should continue to be allocated between the bulk-power and retail systems on the basis of the value of net assets less equity invested in each system, subject to the following revisions:

1. *A share of retail accounts receivable should be considered as receivable by the bulk-power system.*
2. *The net average value should be used for all assets included in the allocation base.*
3. *The apportionment of stores inventory between the bulk-power and retail systems should be positively determined on a regular basis.*

B. DEPRECIATION

Depreciation costs associated with retail assets are allocated directly to the retail system. There is no reason to change this process.

Therefore it is recommended that

Depreciation of retail assets should continue to be directly allocated to the retail system.

C. APPROPRIATIONS OF NET INCOME

The appropriation of net income is required to meet the dual objectives of debt retirement and provision for the Reserve for Stabilization of Rates and Contingencies. Debt retirement is the appropriation of an annual sum sufficient to form in forty years, with interest at four per cent, a sinking-fund for repayment of debt. Provision for the stabilization of rates and contingencies is the appropriation of further funds to meet system growth requirements and maintain financial soundness. The current process allocates each share of the appropriation separately.

The allocation of debt retirement between the bulk-power and retail systems is a two-step process.

1. Interest improvement on accumulated debt retirement is allocated to each system at a rate of four per cent of unmatured equity.
2. Provision for debt retirement is allocated on the basis of net debt on behalf of each system.

The components used in the base of each of the two steps are illustrated in the accompanying table:

<u>Interest Improvement</u>	<u>Bulk-Power System</u>	<u>Retail System</u>
Accumulated debt retirement	<u>xxx</u>	<u>xxx</u>
Less:		
Matured equity*	<u>xxx</u>	<u>xxx</u>
Extraprovision**	<u>xxx</u>	<u>xxx</u>
Net debt retirement	<u>xxx</u>	<u>xxx</u>
Rate of interest improvement	<u>.04</u>	<u>.04</u>
Interest improvement	<u>a1</u>	<u>a2</u>

Deduct sum of a1 and a2 from total appropriation to ascertain balance to be allocated on net debt.

<u>Net Debt</u>	<u>Bulk-Power System</u>	<u>Retail System</u>
Average capital	<u>xxx</u>	<u>xxx</u>
Less:		
Depreciation reserve	<u>xxx</u>	<u>xxx</u>
Unallocated deprec'n	<u>xxx</u>	<u>xxx</u>
Write up	<u>(xxx)</u>	<u>(xxx)</u>
Matured equity	<u>xxx</u>	<u>xxx</u>
Contributed capital	<u>0</u>	<u>xxx</u>
Net debt	<u>xxxx</u>	<u>xxxx</u>
Provision	<u>b1</u>	<u>b2</u>
Total debt retirement	<u>a1+b1</u>	<u>a2+b2</u>

* Matured equity represents that debt which was incurred more than forty years previously and therefore has been fully retired.

** Extraprovision represents excess debt retirement provision accumulated in the period 1938 to 1965 when the provision was calculated on the gross cost of fixed assets.

The current allocation of the provision for stabilization of rates and contingencies is carried out as follows:

1. For each of the bulk-power and retail systems, the allocation base is calculated as total annual capital expenditures less the total of the annual depreciation charge and debt-retirement appropriation.
2. The provision is allocated between the two systems in relation to the values calculated in the allocation base.

The allocation of debt retirement agrees with the principle of systematically retiring debt, as provided for in the corporate financial policy. The specific elements used to determine the base for allocation and their content are consistent with those used historically to allocate debt retirement on behalf of each system. These elements reflect the purposes for which the debt has been incurred. The team held that to continue this allocation process for debt retirement was appropriate.

The base used to allocate system expansion is a reasonable measure of the current degree of expansion in each system.

The allocation of the two parts of the appropriation independently contrasts with the intended purpose of the single appropriation to provide funds internally for system growth, while ensuring that the corporate financial position remains stable and that debt is fully retired within the required forty-year period.

The study team proposed allocating the entire appropriation of net income between the two systems using the base previously applied only to the provision for stabilizing rates: that is, net capital expenditures less depreciation and debt retirement. The debt-retirement portion should continue to be allocated in ac-

cordance with the current process to be applied as a minimum against the total appropriation and to develop the base for allocating the provision. If after the debt-retirement portion is deducted, the allocation to either system is negative, the debt-retirement allocation should be established as the minimum allocation for that system, and the provision for stabilizing rates should be allocated entirely to the other system.

This proposal provides for drawing funds required to meet growth requirements from the customers of each system in proportion to that system's needs. Current data suggest the proposal will result in a significant shift in the allocation of the provision for stabilization of rates and contingencies from the retail to the bulk-power system. This would reflect the greater growth taking place in the bulk-power system, and the more stable debt-equity ratio of the retail system. Allocating appropriation of net income this way agrees with the corporate financial policy of having a single appropriation for debt retirement, system growth, and maintaining financial soundness, the minimum annual level of which should be established by the requirement for debt retirement.

Therefore it is recommended that

1. *The appropriation of net income should be allocated between the bulk-power and retail systems on the basis of total annual capital expenditures, less the sum of the annual depreciation charge, and the allocation of debt retirement.*
2. *The debt-retirement portion should be allocated between the two systems as follows:*
 - Interest improvement should continue to be allocated to each system at a rate of four per cent of net equity.*
 - Provision for debt retirement should continue to be allocated on the basis of net debt on behalf of each system.*
 - The provision for stabilization of rates and contingencies should be designated as the total appropriation as allocated, less the debt-retirement portion as allocated.*
 - Where the provision for stabilization of rates and contingencies for either system would be negative, a negative allocation should not be made, but the entire provision should be directed to the other system.*

V. OVERHEAD POLICY AND PROCEDURES

The method used to determine the total amount of administrative costs to be allocated to capital construction activities each year directs all administrative costs into one of four categories:

1. Those administrative activities relating directly to capital construction activities are allocated entirely to capital construction.
2. Those administrative activities having a significant relationship to capital construction are allocated to capital in the ratio of projected growth in electricity demand to total electricity demand anticipated six years hence.
3. Those administrative activities having a minor relationship to capital construction are allocated to capital at ten per cent.
4. Those administrative activities not related to construction are allocated entirely to operating-costs.

The percentages in categories 2 and 3 are adjusted slightly in practice to relieve operating-costs of the cost of administrative overhead activities associated with recoverable work for others. In 1974 the rate of allocation to capital and recoverable work for Category 2 was 39.6 per cent, and for Category 3 12.2 per cent. The resulting allocation is deemed, in total, to allocate costs appropriately.

The cost-of-power procedures extend this general approach to arbitrary application to individual accounts. Consequently, it is assumed that for each account within a category, the same proportion is associated with capital construction. The balance remaining becomes the measure of that specific account's association with the annual cost of power.

The general approach may be adequate for determining the appropriate allocation between current and future operations in total. However, the approach used to allocate individual accounts should recognize that the activities of each account vary in their relationship to construction activity, and that the resulting net account value is subject to its own particular allocation in the cost-of-power process. Because the retail customers are often allocated a specific portion of the net account value, the effect of invalid balances in the accounts at this opening stage of allocation is of greater significance to the retail system.

For example, the study team agreed that within the current overhead policy and procedures Category 2 overhead is the most appropriate to apply to regional supply cost. They found, though (and region management believes) that the incremental activity in supply costs caused by capital construction is probably much greater than the broad categorization approach would indicate. If the findings are reasonably accurate, and the current categorizing process achieves the proper overall results, then within the category there is at least one account where incremental association with capital construction activity is overstated. If the offsetting activity is not related to the retail system, the net result will be an overcharge to the retail system.

As was said earlier, the overhead policy and procedures establish a portion of the administrative costs which are judged at the corporate level to be incremental to capital construction for the current year. This judgement is made without acknowledging the actual division between capital and maintenance applicable to individual activities that region management and members of the study group have recognized. Throughout the study, recommendations have been made that will result in a fairer and more accurate allocation of costs to the retail system. The study team found that Ontario Hydro could arrive at a more representative allocation of costs to the retail system if overhead allocation pro-

cedures were designed to recognize the varying degrees of involvement with capital construction among the specific account functions.

The study team believed specific proposals should be directed at matters which were of primary concern to the retail system only. They are now aware that it may not be feasible to confine any changes in overhead allocation procedures to the retail system alone, or even to processes within the cost-of-power system.

Therefore it is recommended that

The corporate overhead procedures should be reviewed to obtain more precise overhead allocations by function.

VI. OBSERVATIONS AND CONCLUSIONS

A. STATEMENT OF EFFECTS

A 'Statement of Effects' of these recommendations as applied to actual costs in 1975 is provided in Appendix II. The statement displays the overall results of the current allocation, the allocation in accordance with the recommendations, and the net change.

The statement shows that the proposed allocations do not make any significant change in the total costs of the retail system. While the net effect is approximately a two-per-cent increase in costs based on 1975 data, it is the result of several significant variances in either direction, and represents a much more sensitive allocation process.

There were no changes recommended in the content of direct operating and maintenance charges to the retail system. Applying the recommendations for administrative costs, on the other hand, would increase the allocation to the retail system by 12 per cent (\$3 million). Area administration in total would result in only a minimal increase in costs allocated to the retail system. However, the portion identified as customer service would be twenty per cent less than previously, with an offset effect in the general portion. The significant effect here would be that any changes introduced in the general operation segment of area administrative activity would only result in proportionate changes in retail costs, but changes in the customer service activity would be wholly reflected in the retail system.

Carrying out the recommendations would produce an overall increase in head-office and regional office administrative costs directed to the retail system of twenty-two per cent (\$2 million). This change appears as a major increase in regional office allocations, partly offset by a reduction in the head-office allocation. The result, though, is owing to several factors. The identification of region administration's close association with the retail system through more specific allocations and a regionally oriented base for allocations of general costs has undoubtedly resulted in the increased regional allocation. The reduction in the head-office allocation can be accounted for by the elimination of certain functions from any retail allocation, and the use of allocation bases which give a truer reflection of each group's activities. This effect is netted to some extent by the addition of other groups to the retail allocation process. The value of comparing the effect on each of regions and head office is questionable because of the general nature of the present allocation. The study team held that through the recommended allocation process changes in the structure or activity of either the regions or retail related head-office functions would be more accurately reflected in the retail system. For instance, with the present allocation system a revision in the costing-methods for thermal station direct labour resulted in a reduction of costs to the retail system.

Other specifically allocated retail costs have been increased, primarily because of the specific allocation of customer billing activity, partly offset by the allocation of a share of public liability and property-damage insurance to the bulk-power system.

The recommendations would reduce committed costs and appropriations allocated to the retail system by two per cent (\$1 million). The net result of introducing consistency in the content of elements used in allocating interest caused the reduction in the amount directed to the retail system.

The 'Statement of Effect' also displays the effect of the recommendations region by region, with comparison by region total

only. Carrying through the recommendations for more specific allocation processes would generally shift the retail costs to those regions which do in fact have a higher degree of retail activity from those regions which have a more significant involvement with hydraulic and system operations.

The proposed allocation processes would identify for each region all its own area and regional administrative costs as incurred. The processes would also provide an allocation of head-office administrative costs more specifically identifiable with individual regions. These processes would then lead to the more appropriate allocation of retail costs by region.

B. SUMMARY OF RECOMMENDATIONS

Regional and Area Costs

1. Direct Activities

Retail-line clearing, customer service, maintenance, customer applications, and repair of storm damage should continue to be charged directly to the retail system.

2. Area Administrative Costs

- a. Customer-service activities as defined should be collected by area and allocated directly to the retail system.
- b. After the allocation of customer service, a share of area administrative costs should continue to be allocated to capital based on the overhead policy.
- c. The remainder of area administrative costs should be allocated between the retail and bulk-power systems, on the basis of total direct costs in the areas by region.

3. Regional Supply Costs

- a. Stores activity wholly associated with operating the bulk-power system should be separated in the accounting-system.
- b. The allocation of regional supply costs should continue to be as follows:

1. A share of regional supply costs should be allocated to capital in accordance with the overhead policy
2. The rest should be allocated between the bulk-power and retail systems on the basis of the value of each region's issues from stores as recorded in the materials system.

4. Regional Administrative Expenses

- a. A share of each administrative function in the regions should continue to be allocated to capital in accordance with the overhead policy.
- b. Regional administrative functions as designated by each region should be allocated on a specific percentage basis to each group of customers and the bulk-power system.
- c. The rest of regional administrative costs should be allocated between the bulk-power and retail systems by region, based on total direct costs.

Head-Office Costs

5. Costs Incurred Directly on Behalf of the Retail System

For each head-office function where specific services are provided for the retail system, the cost of the service should be identified and charged to the retail system.

Currently the costs to be specifically charged consist of:

- a. Public liability and property damage insurance,
- b. Customer billing-costs,
- c. Meter Services Department, and
- d. System Maintenance Division costs associated with the Retail System.

6. Costs in Support of both the Bulk-Power and Retail Systems

- a. A share of each head-office administrative function should continue to be allocated to capital in accordance with the overhead policy.
- b. The rest of each head-office administrative function should be either allocated directly to the bulk-power system or identified as a service performed partly for the benefit of the regions.
- c. Where a service is performed partly for the benefit of the regions,
 - 1. The cost of that service should be measured to determine the portion attributable to each region. (Specific methods of measurement are set out in the report.)
 - 2. Each region's share should be allocated between the bulk-power and retail systems in the same way as related regional costs.

7. Costs Not Associated with the Retail System

For each head-office administrative function where activity does not benefit the retail system, or where like activity similarly benefits other customer groups, all costs, after allocations have been made to capital, should be allocated to the bulk-power system.

Committed Costs and Appropriations of Net Income

8. Interest Expense

Interest expense should continue to be allocated between the bulk-power and retail systems on the basis of the value of net assets, less equity invested in each system, subject to the following revisions:

- a. A share of retail accounts receivable should be considered as receivable by the bulk-power system.
- b. The net average value should be used for all assets included in the allocation base.
- c. The apportionment of stores inventory between the bulk-power and retail systems should be positively determined on a regular basis.

9. Depreciation

Depreciation of retail assets should continue to be directly allocated to the retail system.

10. Appropriations of Net Income

- a. The appropriation of net income should be allocated between the bulk-power and retail systems on the basis of total annual capital expenditures, less the sum of the annual depreciation charge and the allocation of debt retirement.

b. The debt-retirement portion should be allocated between the two systems as follows:

- 1. Interest improvement should continue to be allocated to each system at a rate of four per cent of net equity.
- 2. Provision for debt retirement should continue to be allocated on the basis of net debt on behalf of each system.
- c. The provision for stabilization of rates and contingencies should be designated as the total appropriation as allocated, less the debt retirement portion as allocated.
- d. Where the provision for stabilization of rates and contingencies for either system would be negative, a negative allocation should not be made, but the entire provision should be directed to the other system.

Overhead Policy and Procedures

- 11. The corporate overhead procedures should be reviewed to obtain more precise overhead allocations by function.

RESULTS OF IMPACT STUDY

Appendix I

TABLE 1

NON-COMMON FACILITIES STUDY

Increase in 1975 Non-Common Costs

Increase (Decrease) \$000's

	<u>TI*</u>	<u>TII*</u>	<u>S/F Lines</u>	<u>Meters</u>	<u>Sundry</u>	<u>Total</u>
230 kV reclassification	10,744	-	-	-	491	11,235
Meters reclassification	-	-	-	(788)	-	(788)
Transformation Losses	1,265	1,815	-	-	-	3,080
Increased S/F capital	-	-	3,985	-	-	3,985
Increased interest rate	4,267	2,813	854	-	-	7,934
Administration charge	3,974	2,344	745	-	-	7,063
TI to TII	<u>(15,426)</u>	<u>15,426</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
	<u>4,824</u>	<u>22,398</u>	<u>5,584</u>	<u>(788)</u>	<u>491</u>	<u>32,509</u>

* Includes Specific Facility Stations

TABLE 2

Changes in 1975 Bulk Power Costs

Increase (Decrease) \$000's

	<u>Municipal</u>	<u>Retail</u>	<u>Direct</u>	<u>Total</u>
Common Costs*	(20,062)	(7,517)	(4,439)	(32,018)
Transformation I	(2,274)	2,788	371	885
Transformation II	3,777	(1,865)	800	2,712
Specific-Facility Stations	16,800	6,444	381	23,625
Specific-Facility Lines	558	4,815	211	5,584
Meters	(622)	(54)	(112)	(788)
	<u>(1,823)</u>	<u>4,611</u>	<u>(2,788)</u>	<u>-</u>

* Includes Distribution and Metering, which are allocated on a common basis. It also includes the discount provided to Direct Industrial Customers taking power at 230 kV.

APPENDIX II: Glossary

Cost Pooling

The system of collecting costs according to the functions that perform the various components of the power system. These 'pooled' costs are then shared on a pro-rata basis according to use.

Costing-Demand

Ontario Hydro uses the annual average of each customer's monthly peak power consumption to allocate bulk-power costs other than energy. Synonomous with Costing-Load.

Customer Class

There are two levels of customer classes in Ontario Hydro. The first consists of wholesale customers. This is made up of the municipal utilities responsible for retailing power to consumers, with an artificial entity known as the Power District. The Power District consists of the customers Ontario Hydro serves directly, and is divided into two customer classes which make the second level of customer classes; namely the direct industrial and retail categories.

Debt-Retirement Charge

An annual charge to the cost of power which, together with interest at 4 per cent per annum, will retire debt over a forty-year period.

Function

A pooling of costs relating to a service provided by the power system that is relatively standard in nature and quality.

Grid

Interconnected network of transmission and transforming facilities, including step-up transformation at the generating stations, interconnecting lines between sources of power, and step-down transformation to 115 kilovolts; also included are communication facilities such as microwave stations.

Radial Lines

Transmission and distribution lines which branch out from the grid and carry power to the customers' points of delivery.

Sinking-Fund Depreciation

A compound-interest method of apportioning depreciation over the life of an asset. It involves a constant annual charge which, together with compound annual interest, reaches a total equal to the original cost of the asset at the end of its expected service life. The annual depreciation charge increases as the age of the asset increases.

Straight-Line Depreciation

The method of charging an equal share of the original cost of an asset to operations in each accounting-period of its estimated service life.

Transformation, Stage I

The present grouping for cost-allocation purposes of all costs associated with reducing the voltage from 115 kilovolts to a voltage above 10 kilovolts.

Transformation, Stage II

Currently comprises the costs of stations that step power down to voltages below 10 kilovolts.

NEW INFORMATION REQUIREMENTS FOR ELECTRICITY COSTING
RETAIL DISTRIBUTION SYSTEM COSTS

<u>Report Recommendation</u>	<u>Information Required</u>	<u>Reason for Requirement</u>	<u>Information Source</u>	<u>Current Availability of Information</u>
1(a)	A specific sub-account in the Area administration Account (508)	To segregate Retail Clerical Data	Budgetary Controls	Not Available
(b)	A fixed distribution of Area clerical time against retail	To specifically charge retail for customer-service effort	Regions (Normally in conjunction with Budget)	Available from Area Clerical Work Standards
(c)	The annual percentage split of Area direct operating-costs between retail and bulk power by region	To provide a basis for allocating general Area administrative expense	Financial and Operations Accounting	Available from I.I.S. Runs
3(a)	A specific accounting classification for stores activity related primarily to bulk power system	To properly reflect content of stores costs allocated to retail	Budgetary Controls and Regions	Not Available
4(a)	The budgeted percentage of costs related to: 1. Retail customers, 2. Municipal customers, 3. Direct Industrial customers, and 4. The Bulk-Power system For all departments of each Region.	To allocate costs in appropriate proportions for departments with reasonably identifiable association with activities	Regions (at budget time)	Not currently produced
(b)	The annual percentage split of regional direct operating-costs between retail and bulk-power systems, by region	To allocate general regional administrative expense	Financial Operations Accounting	Base data available from Integrated Information System
5(a)	Last year's retail revenue	To allocate share of PL & PD insurance to retail	Financial Operations Accounting	All data is currently identified for other reasons and is not used in the retail allocation process
(b)	Customer system operating-costs	To allocate customer billing-cost to retail	Computing Branch	
(c)	Retail mailing-costs	To allocate customer billing-cost to retail	Mailing, number of bills, postage, envelopes and labour available from Central Mailing	

<u>Report Recommendation</u>	<u>Information Required</u>	<u>Reason for Requirement</u>	<u>Expected Information Source</u>	<u>Current Availability of Information</u>
5(d)	The percentage split of costs associated with retail for System Maintenance Division	To allocate appropriate share to retail	System Maintenance and Budgetary Controls	Annual Work Program Budget
6(a)	The ratio of controllable costs in each region to total controllable costs	To allocate general administrative cost to each region	Financial and Operations Accounting	Base data available from financial statements
(b)	See 4(b)	To allocate the costs within regions	See 4(b)	See 4(b)
(c)	The percentage value of materials transferred to regions	To allocate general supply costs by region	Supply Administration	Currently identifiable
7(a)	The average month's bulk-power cost to the retail system	To allocate interest on retail receivables	Financial and Operations Accounting	Currently identifiable
8(b)	Average value of fuel inventories and stores inventories	To more accurately allocate interest	Financial and Operations Accounting	Currently identifiable
(c)	Split of stores inventory value between retail and bulk power	To more accurately allocate interest	Customer and Materials Accounting (assistance from Regions and Supply)	Available from Material flow records and judgement

APPENDIX IV

Functions Classified as

Administrative Office Expense in the Current Allocation of the Cost of Power

HEAD OFFICE

Treasury Division
Executive Secretarial
Law Division
Security Division
Computer and Data Systems Planning Division
Computing Services Division
Staff Relations Division
(Except Municipal Labour Relations)
Health and Safety Division
Manpower Resources and Development Division
Data Processing Division
Metric Conversion and Standards Department
Board of Directors
General Management
Financial Information Systems Division
Comptrollers Division
Branch Personnel Staff
Power Market Analysis
Corporate Services Division (Except Advertising Department)

REGION OFFICES

Accident Prevention
Accounting
Personnel
Region Management
Cost of Space
Switchboard and Telephone
Training
Office Services
Public Relations

Statement of Effect of Recommendations
 For Revision to the Retail System Cost Allocation Process
 Based on the Year Ended December 31, 1975

	TOTAL EFFECT			EFFECT BY REGION						
	Current Allocation	Proposed Allocation	Change	Niagara	Central	Western	Eastern	Georgian Bay	Northeast	Northwest
Direct Operating and Maintenance Costs										
Maintenance	11,950	11,950	Ø	1,436	948	2,195	2,585	2,484	1,762	540
Customer Service	9,145	9,145	Ø	1,174	908	1,404	1,978	1,816	1,446	419
Line Clearing	7,427	7,427	Ø	900	652	742	1,857	2,157	954	166
Customer Applications	1,109	1,109	Ø	140	159	203	175	226	173	32
Storm Damage	1,180	1,180	Ø	73	36	228	149	665	29	Ø
	<u>30,811</u>	<u>30,811</u>	<u>Ø</u>	<u>3,723</u>	<u>2,703</u>	<u>4,772</u>	<u>6,744</u>	<u>7,348</u>	<u>4,364</u>	<u>1,157</u>
Administrative Costs										
Area Administrative Costs	5,987	4,725	(1,262)	532	561	697	910	877	932	216
- Customer Service	6,031	7,087	1,056	1,026	790	1,048	1,783	1,427	738	275
- General Operations										
Region Administration	1,820	5,817	3,997	467	672	1,045	1,435	1,034	839	325
Head Office Administration	7,230	5,260	(1,970)	564	421	793	1,257	1,284	709	252
Meter Services	3,633	363	Ø	45	37	51	87	85	45	13
Billing Costs	3,047	4,153	1,106	609	430	723	906	685	669	131
Supply Costs	1,042	1,320	278	172	89	177	316	281	198	87
PL & PD Insurance	155	62	(93)	9	9	9	14	11	8	3
Miscellaneous General Expense	31	Ø		(12)	3	(113)	28	(27)	57	(5)
	<u>25,706</u>	<u>28,818</u>	<u>3,112</u>	<u>3,392</u>	<u>3,011</u>	<u>4,530</u>	<u>6,736</u>	<u>5,657</u>	<u>4,195</u>	<u>1,297</u>
Committed Costs and Obligations										
Depreciation	20,544	20,544	Ø	2,321	1,821	2,732	5,252	4,672	2,812	934
Interest	20,913	19,869	(1,044)	2,286	2,058	2,515	5,284	4,848	2,187	691
Debt Retirement	5,496	5,496	Ø	632	569	695	1,461	1,340	607	192
Provision for Stabilization of Rates and Contingencies	<u>Ø</u>	<u>46,953</u>	<u>45,909</u>	<u>Ø</u>	<u>5,239</u>	<u>4,448</u>	<u>5,942</u>	<u>11,997</u>	<u>Ø</u>	<u>Ø</u>
TOTAL Proposed Allocation	105,538			12,354	10,162	15,244	25,477	23,865	14,165	4,271
TOTAL Current Allocation				<u>12,316</u>	<u>9,817</u>	<u>14,526</u>	<u>24,716</u>	<u>23,319</u>	<u>14,366</u>	<u>4,410</u>
VARIANCE				<u>38</u>	<u>345</u>	<u>718</u>	<u>761</u>	<u>546</u>	<u>(201)</u>	<u>(139)</u>

NEW INFORMATION REQUIREMENTS FOR ELECTRICITY COSTING:
NON-COMMON FUNCTION COSTS

Report recommendation	<u>Information Required</u>	<u>Reason for Requirement</u>	<u>Expected Information Source</u>	<u>Current Availability of Information</u>
4	Capital cost of meters identified as one property class	To help identify the full cost of metering as one function	Plant Accounting	Combined with other data but identified as meters
4	Operating and maintenance costs associated with meters	To help identify the full cost of metering as one function	Regions	Some are identified but further accounts are required
8	Marginal costs of transformation to below 115 kV	To establish stages (cost pools) for the transformation function	Power Costing	Expected to be produced annually
8	Capital cost of transformation stations with secondary voltages between 10 kV and 20kV	To provide a basis for new cost pools	Plant Accounting	Expected to be available from new plant accounting system
9	Transformation losses in terms of demand and energy	To permit transferring the cost of losses to non-common functions	Stations, T & D Division	Not currently produced
10	Capital cost of stations and low-voltage lines located within customers' boundaries for their sole benefit	To standardize the treatment of specific facilities	Regions and Plant Accounting	Regions have maps giving the information
12	Average long-term borrowing-rate	To calculate non-common interest cost	Financial and Operations Accounting	Currently calculated for other reasons

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